



## IA2030 Technical Progress Report to SAGE 2022

*This document provides a brief commentary on the most recent global immunization data and an update on implementation of the Immunization Agenda 2030 (IA2030). SAGE is asked to:*

- *Comment on the immunization data.*
- *Endorse the action agenda.*

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## A. Executive summary

Immunization coverage and other data show that **global immunization suffered another significant and widespread setback in 2021**, due primarily to the continuing disruption caused by the COVID-19 pandemic and a global focus on COVID-19 vaccine rollout. Introduction of COVID-19 vaccines in all but two countries by the end of 2021 was a remarkable achievement, saving millions of lives, but has also been a contributor to significant backsliding in the coverage of other life-saving vaccines, compounding the regression seen in 2020. Multiple other factors, including economic deterioration, persistent conflict in some countries and large-scale population movements, have also presented major challenges to national immunization programmes.

Data for key Immunization Agenda 2030 (IA2030) indicators show that:

- An estimated 4 million future deaths were averted by immunization in 2021, but failure to achieve 2021 coverage targets will result in an extra 240,000 avoidable deaths.
- Global DTP3 coverage fell to 81%, 5% lower than in baseline year 2019 and its lowest level since 2008.
- The number of zero-dose children, those under 1 year of age not receiving DTP1, rose to 18.2 million (13.6 million in 2019), a number not seen since 2005.
- The composite breadth-of-protection indicator, average coverage of a set of vaccines given at different ages, fell to 68% (70% in 2019), having risen continuously from 1992 to 2019.
- The number of new vaccine introductions in low- and middle-income countries reached a record high, because of COVID-19 vaccine introductions. However, excluding these, the number was the second lowest since 2000.

Without an immediate course correction, most 2030 immunization globally committed impact goal targets will not be achieved.

**The extent of decline has varied by region and by country income status.** Breadth of protection, for example, has held up in the European region but fallen elsewhere, particularly in the Region of the Americas. DTP3 coverage has been especially affected in two large middle-income countries that have transitioned out of Gavi support. Changes in coverage also varied markedly between countries (and sub-nationally in many countries), with context-specific factors, such as conflict or political instability, also impacting on immunization programmes.

More positively, **145 countries introduced COVID-19 vaccines** in 2021 and global coverage increased significantly. In the first year of COVID-19 vaccination, an estimated 14.4 million lives have been saved. Although the COVID-19 vaccine supply constraints of 2021 have been overcome, COVID-19 vaccine use shows very large disparities, with coverage rates in low-income and lower middle-income countries a fraction of those in high-income and upper middle-income countries.

However, in many places the focus on COVID-19 vaccination has drawn human resources and political commitment away from other aspects of healthcare, including other immunization programmes. The COVID-19 pandemic and control measures have disrupted both health service delivery and health-seeking behaviours, suggesting that the pandemic has also had significant indirect effects on health.

Future progress is likely to be hampered by the **global economic deterioration** triggered by the COVID-19 pandemic and continuing conflict and instability in multiple countries and regions. Almost a third of countries are not projected to return to pre-COVID-19 levels of total government health spending per capita even by 2026.

IA2030 Working Groups have analysed 2021 IA2030 indicator data and other sources of information and, with input from the IA2030 Coordination Group and WHO regional offices, have proposed a set of recommendations to provide a common agenda to be urgently taken forward globally, regionally and nationally.

Immediate priorities are to halt and reverse the backsliding in immunization coverage seen in 2020 and 2021, and to protect those who have missed out on vaccination during pandemic-affected years through catch-up programmes. Since all areas of health have been affected by the COVID-19 pandemic and focus on COVID-19 vaccination rollout, the longer-term aim must be to strengthen primary healthcare systems so they are better able to deliver immunization and other essential services to all, including currently underserved populations, and with the capacity and resilience to continue to deliver services even during times of strain.

In particular, there is an opportunity to use COVID-19 responses and recovery funding to achieve broad benefits in terms of resilient, equitable and sustainable primary healthcare systems. In addition, there are opportunities to ensure that strengthening of immunization programmes is an integral part of future pandemic preparedness investments and actions<sup>1</sup>.

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<sup>1</sup> <https://www.who.int/publications/m/item/strengthening-the-global-architecture-for-health-emergency-preparedness-response-and-resilience>

## B. Action agenda

These recommendations provide a set of priorities around which global partners, regions and countries can align to drive actions in 2022–2023. Achieving each aim will require urgent and coordinated action to be taken by multiple stakeholders across global, regional and national levels. Progress against these recommendations will be monitored and reviewed in a year's time.

The IA2030 Coordinating Group will have responsibility for taking forward the recommendations and ensuring they inform the activities of implementing partners, regions and IA2030 Working Groups (see Box 2).

1. **Support restoration and recovery:** Work with countries to identify the technical support and national, regional and global actions and technical support needed to strengthen national essential immunization services and surveillance systems as part of integrated primary healthcare systems strengthening and pandemic preparedness.
2. **Leverage COVID-19 lessons:** Work with countries to identify and share successful approaches for mainstreaming COVID-19 vaccination into the delivery of essential immunization services and primary health care, and to establish or strengthen platforms to deliver primary health care interventions across the life-course.
3. **Accelerate integrated catch-up:** Work with countries to support the design and implementation of catch-up activities that are equity-focused, tailored to local contexts and encompass children beyond two years of age; use root cause analyses to shape the design of essential immunization services; and establish policies that facilitate vaccination beyond the scheduled target age for those missing vaccination.
4. **Enhance the health workforce:** Work with countries and other health system stakeholders to map out current and anticipated health workforce needs; identify and address factors affecting health worker retention; and use new learning and performance management approaches to enhance health worker capacity and improve the quality of service delivery.
5. **Prioritize health:** Work with countries to ensure prioritization of health, primary healthcare and immunization in government budgets; promote the efficient use of resources; and identify strategies to mobilize additional global financing for immunization and health system strengthening and resilience.
6. **Promote equity:** Work with countries to strengthen systematic equity monitoring within national immunization programmes, to underpin mitigating actions to reduce socio-economic and geographical disparities in vaccination coverage within countries, including strengthening of cross-sectoral subnational accountability mechanisms.
7. **Strengthen demand generation:** Work with countries to promote the use of globally validated tools to assess behavioural and social drivers of vaccination at all levels of immunization programmes, and use the data for understanding reasons for low uptake and to guide continued implementation and improvement of strategies to close gaps in immunization coverage and equity.
8. **Accelerate new vaccine introductions:** Work with countries to understand and overcome barriers to the introduction of WHO-recommended vaccines, and to prioritize their introduction based on country context and disease burdens.

9. **Advance vaccination in adolescence:** Work with countries to identify the most effective ways to strengthen platforms for vaccination in adolescence, with an emphasis on cross-sector collaboration, particularly to reach those who missed human papillomavirus (HPV) vaccination because of COVID-19-related disruption, to extend HPV vaccine coverage, and to introduce HPV vaccination where it has yet to be implemented.
10. **Invest in vaccine research:** Strengthen the global research environment for new vaccine development and implementation, for example through increased investment in new vaccine R&D for priority pathogens, leveraging COVID-19-driven technological innovations, strengthening national regulatory systems and global regulatory collaboration, and diversifying global manufacturing capacity.
11. **Enhance knowledge sharing:** Create a “knowledge-sharing hub” where partners can share their analyses and intelligence, and other evidence relevant to achieving IA2030 objectives.
12. **Achieve change:** Establish monitoring, evaluation and action (ME&A) cycles with a feedback loop at global and regional levels to take forward and report on this action agenda (see Annex 1).

## C. Introduction

In 2021, the World Health Assembly reviewed the IA2030 Framework for Action<sup>2</sup>, which set out principles for the implementation of the Immunization Agenda 2030 (IA2030) and outlined IA2030's monitoring and evaluation (M&E) framework. The M&E framework is aligned with IA2030's three impact goals (Box 1) and seven strategic priorities.

### Box 1: IA2030 Impact Goals and targets

IA2030 Impact Goals	Targets
<p><b>1</b> Reduce mortality and morbidity from vaccine-preventable diseases for everyone throughout the life course</p>	<b>1.1</b> 50 million future deaths averted globally
	<b>1.2</b> All countries achieve the endorsed VPD control, elimination and eradication targets
	<b>1.3</b> All selected VPDs have a declining trend in the number of large or disruptive outbreaks
<p><b>2</b> Leave no one behind, by increasing equitable access and use of new and existing vaccines</p>	<b>2.1</b> 50% reduction in the number of zero dose children
	<b>2.2</b> 500 vaccine introductions in low- and middle- income countries
<p><b>3</b> Ensure good health and well-being for everyone by strengthening immunisation within primary health care and contributing to universal health coverage and sustainable development</p>	<b>3.1</b> 90% global coverage for DTP3, MCV2, PCV3, and HPVc
	<b>3.2</b> Improve Universal Health Coverage

This document provides an **overview of global immunization data for 2021**, organized around the IA2030 M&E framework. Indicators have been assigned to IA2030 Working Groups, which have provided commentary on 2021 data and trends (with 2019 being used as a baseline for most indicators). Where relevant, Working Groups have also provided descriptive insights, drawing on additional information sources to provide a more complete and up-to-date picture.

The context for 2021 continued to be dominated by COVID-19, the effects of both the pandemic itself and the vaccination programmes introduced to combat it. The pandemic disproportionately affected health workers, affecting service delivery, as well as health-seeking behaviour, exacerbated by the imposition of travel and other restrictions. The implementation of COVID-19 vaccination programmes has been a high priority for most countries, often drawing attention and resources away from other areas of healthcare and leading to reassignment of human resources. Successive WHO 'Pulse' surveys on essential health services have documented continuing disruption to health services through 2021 (Figure 1)<sup>3</sup>. A fourth Pulse survey in late 2022 will provide an update on the degree of recovery.

<sup>2</sup> Implementing the Immunization Agenda 2030: A Framework for Action. <https://www.immunizationagenda2030.org/framework-for-action>

<sup>3</sup> [https://www.who.int/docs/default-source/coronaviruse/final-ppt\\_global-ehs-pulse-survey-round-3\\_for-publication\\_7-feb-2022.pdf?sfvrsn=a49a8657\\_1&download=true](https://www.who.int/docs/default-source/coronaviruse/final-ppt_global-ehs-pulse-survey-round-3_for-publication_7-feb-2022.pdf?sfvrsn=a49a8657_1&download=true)

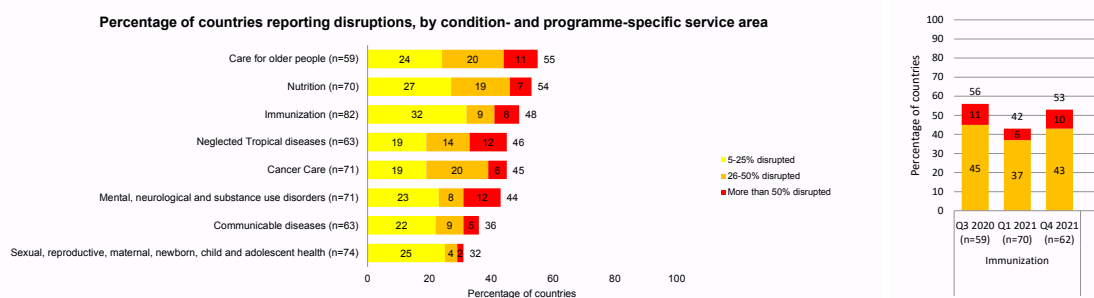


Figure 1: Left: Data from the Pulse survey in November–December 2021 showing degree of disruption of health services, including immunization<sup>3</sup>. Right: Reported disruption of immunization services over three rounds of Pulse surveys, showing persistent disruption through 2021 in countries responding to all three survey rounds (orange: 5–50% disrupted; red: >50% disrupted)<sup>3</sup>.

Nevertheless, there was also significant variation between countries, with some maintaining coverage of essential vaccines while also introducing COVID-19 vaccination, others scaling up COVID-19 vaccine introduction but experiencing a decline in coverage of other vaccines, and some maintaining coverage of essential vaccines but with limited use of COVID-19 vaccines. Other local factors, particularly social unrest and conflict, have had significant impacts on some countries, emphasizing the need for tailored responses that reflect local contexts.

The COVID-19 pandemic is also contributing to the worst global economic downturn since World War II, exacerbated in 2022 by geopolitical tensions, including the war in Ukraine and continuing conflict and instability in multiple other countries. Recovery is highly uneven: many countries are seeing considerable cuts in government spending resulting from falling gross domestic product, with implications for government financing for health (including immunization). This could lead to widening rifts in country ability to finance recovery from the COVID-19 health shock, including recovery of routine immunization. According to recent World Bank projections, 52 countries (including 38 low- and middle-income countries), or about 30% of all countries, will not return to pre-COVID-19 levels of total government health spending per capita even by 2026<sup>4</sup>.

Following an overview of immunization in 2021, this document summarizes activities that have taken place to **implement the IA2030 strategy at national, regional and global levels**. It also includes a set of **recommendations** that have been developed in collaboration with IA2030 Working Groups, WHO regional offices and the IA2030 Coordination Group.

As always, the data should be interpreted with caution. Reported immunization data are subject to limitations inherent in the way coverage and surveillance data are collected nationally (particularly as fewer coverage surveys have been undertaken due to COVID-19 pandemic disruptions so coverage estimates rely heavily on country-reported data), and the COVID-19 pandemic and responses to it have continued to disrupt data collection and reporting in several countries. In particular, it is likely that vaccine-preventable disease cases are under-reported owing to disruption of surveillance, as well as weaknesses in surveillance infrastructure in many countries. Country reporting is incomplete for some indicators, while for other indicators data collection is at the stage of pilot implementation in a limited number of countries.

<sup>4</sup> World Bank. From Double Shock to Double Recovery: Health financing in the time of COVID-19. 2021.

<https://www.worldbank.org/en/topic/health/publication/from-double-shock-to-double-recovery-health-financing-in-the-time-of-covid-19>

## Box 2: Development and use of the 2022 Technical Progress Report to SAGE

This Technical Progress Report to SAGE 2022 has been put together through a consultative process coordinated by the IA2030 Monitoring and Evaluation (M&E) Working Group, supported by the IA2030 Secretariat.

Individual **IA2030 Working Groups** have been assigned responsibility for Impact Goal and Strategic Priority Objective indicators. Following the release of global immunization data for 2021, IA2030 Working Groups were supplied with a template and asked to provide a commentary on the data, as well as other sources of relevant information to provide a more complete picture of their specialist areas. They were also encouraged to draft potential recommendations for consideration by SAGE.

A series of **regional consultations** were also held to obtain regional input into Working Group commentaries and analyses and into the recommendations. Recommendations were also drawn from the outputs from an extraordinary meeting of the IA2030 Coordination Group held in August 2022 following the release of 2021 immunization data, to generate a unified set of global recommendations to guide future actions.

The contributions from IA2030 Working Groups, regions and the IA2030 Coordination Group have been synthesized into this Technical Progress Report, which includes links to supplementary documents containing the longer Working Group analyses when these provided additional depth.

Recommendations have been divided into four categories:

- High-level recommendations to guide urgent and coordinated global, regional and national responses (included above)
- Technical recommendations: These are detailed recommendations related to IA2030 Strategic Priorities that are being refined in collaboration with Working Groups and regions with a view to their being presented at a future SAGE meeting
- ME&A Framework recommendations: These are process updates, indicator revisions and areas requiring in-depth technical review that are being considered by the M&E Working Group and will feed into an updating of the IA2030 ME&A framework (Annex 1).
- Policy review recommendations: These are recommendations for development of new immunization policy in specific areas or for review and revision of existing policy.

Responding to the GVAP review, which identified a disconnect between SAGE recommendations and action, the IA2030 Coordination Group is working to strengthen the ownership and accountability needed to give the recommendations a stronger likelihood for action and for true impact. Upon finalization of the Technical Progress Report, to include a clear set of action-oriented recommendations following SAGE deliberations, the Coordination Group will forward recommendations to appropriate stakeholders (immunization partners working at global, regional and country levels), and discuss these with the IA2030 Partnership Council (IAPC) at its next meeting in November 2022. Tracking actions taken in response will be the responsibility of the Coordination Group and will be reviewed each year with the IAPC to assess annual progress, as part of the IA2030 commitment to greater accountability.



### Box 3: SAGE 2021 recommendations

At its October 2021 meeting, SAGE made the following recommendations:

SAGE recommends that to achieve the IA2030 vision and goals, countries, regions, partners, IA2030 Working Groups and other stakeholders must act together to:

- Perform country-by-country analysis of current status and reasons for backsliding, to determine gaps and needs at the national and subnational levels.
  - *Progress: Country-level data enables countries to benchmark their status and identify key trends, and some countries have made progress in this area. However, it has not proven possible to systematically track progress towards this recommendation at the global level.*
- Develop, implement and monitor tailored action plans to respond to the underlying reasons for backsliding. The country-by-country analysis and holistic assessment at regional and global levels will inform the necessary actions to be taken at country, regional and global levels.
  - *Progress: No systematically collected data are available to track progress towards this recommendation, but multiple countries (assisted by regions) have begun to develop recovery plans.*
- Use the momentum generated by political interest in COVID-19 vaccines to build support for and strengthen essential immunization services in the context of overall health system strengthening, declaring 2021 and 2022 years for recovery and scale up of immunization programme activities to recover the ground lost and to “build back better”.
  - *Progress: A wide range of communication and advocacy activities have been undertaken to generate further support for immunization. Global political engagement on COVID-19 vaccination suggests a growing awareness of immunization backsliding, but it is not yet clear whether this is translating into action.*

SAGE noted with satisfaction the progress on the implementation of the IA2030 Framework for Action.

- SAGE recommends that countries use the new Vision and Strategy and the Regional IA2030 plans to develop their own National Immunization Strategies and stresses the need for strong monitoring and evaluation components as well as ownership and accountability mechanisms.
  - *Progress: A first wave of countries have been developing National Immunization Strategies aligned with IA2030 and with monitoring and evaluation components (see Section E below).*

As outlined in the IA2030 Framework for Action, the aim is to establish monitoring and evaluation (M&E) and action cycles, linked to ownership and accountability mechanisms. This year, the IA2030 Coordinating Group plans to track responses to recommendations and the actions taken by global and regional stakeholders (see Box 2).

## D. Immunization in 2021


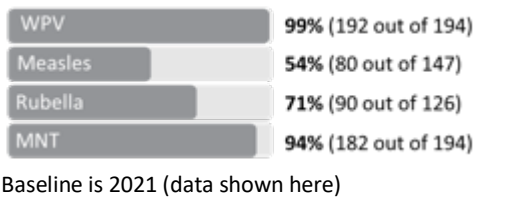
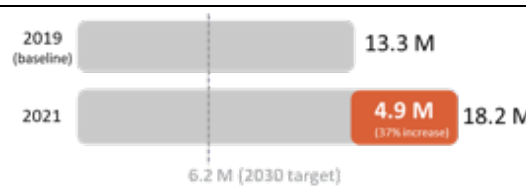
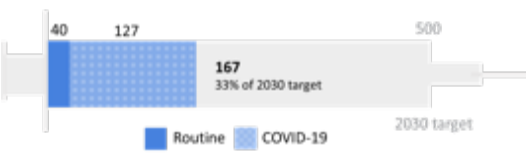
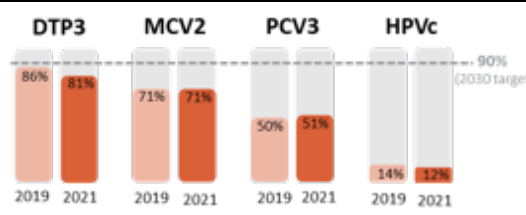

### D.1 Impact goal indicators

The **seven IA2030 impact goal indicators** (Table 1) are outcome and impact measures common across all levels (country, regional and global) and are designed to track progress towards the three IA2030 impact goals. Progress will be assessed against global targets for 2030.

#### *Take-home messages:*

- An estimated 4 million future deaths were averted by immunization in 2021, but failure to achieve 2021 coverage targets will result in an additional 240,000 avoidable deaths.
- No visible progress has been made towards global and regional eradication and elimination goals since 2019.
- The numbers of large or disruptive outbreaks increased for circulating vaccine-derived polioviruses (cVDPVs), wild polioviruses and yellow fever, were unchanged for cholera and meningococcus, and declined for Ebola viral disease and measles.
- The numbers of zero-dose children increased to 18 million (13 million in 2019).
- Coverage of all four indicators of vaccination across the life-course (DTP3, MCV2, PCV3 and HPVc) stalled or dropped in 2021.
- 192 countries had introduced COVID-19 vaccines by the end of 2021, and an estimated 14 million deaths were averted by COVID-19 vaccination within the first year of vaccine use.

Table 1: Impact goal (IG) indicators and targets, baseline and 2021 data

Impact Goal	Indicator	2030 target	2021 Progress from baseline* Unless otherwise noted, 2019 is the baseline																															
1 Prevent disease	1.1 Number of future deaths averted through immunization	50 million future deaths averted by immunization in 2021-2030†																																
	1.2 Number and percent of countries achieving endorsed regional or global VPD control, elimination, and eradication targets‡	All countries achieve endorsed targets  Eradication target endorsed for polio (WPV) and elimination targets for measles, rubella and maternal and neonatal tetanus (MNT). Additional VPD targets may be added in future years.																																
	1.3 Number of large or disruptive VPD outbreaks	Declining trend in the annual number of large or disruptive VPD outbreaks	<table border="1" data-bbox="965 672 1492 985"> <thead> <tr> <th>VPD</th> <th>2018-2020 annual avg.</th> <th>2021</th> <th>Trend</th> </tr> </thead> <tbody> <tr> <td>Cholera</td> <td>1</td> <td>1</td> <td>→</td> </tr> <tr> <td>Ebola</td> <td>1</td> <td>0</td> <td>↓</td> </tr> <tr> <td>Measles</td> <td>51</td> <td>22</td> <td>↓</td> </tr> <tr> <td>Meningococcus</td> <td>2</td> <td>2</td> <td>→</td> </tr> <tr> <td>cVDPV</td> <td>22</td> <td>34</td> <td>↑</td> </tr> <tr> <td>WPV</td> <td>2</td> <td>3</td> <td>↑</td> </tr> <tr> <td>Yellow Fever</td> <td>4</td> <td>6</td> <td>↑</td> </tr> </tbody> </table>	VPD	2018-2020 annual avg.	2021	Trend	Cholera	1	1	→	Ebola	1	0	↓	Measles	51	22	↓	Meningococcus	2	2	→	cVDPV	22	34	↑	WPV	2	3	↑	Yellow Fever	4	6
VPD	2018-2020 annual avg.	2021	Trend																															
Cholera	1	1	→																															
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2 Promote equity	2.1 Number of zero-dose children	50% reduction in number of zero-dose children																																
	2.2 Introduction of new or under-utilized vaccines in low- and middle-income countries	500 vaccine introductions by decade's end																																
3 Build strong immunization programmes	3.1 Vaccination coverage across the life-course	90% coverage of full course for selected vaccines																																
	3.2 UHC Index of Service Coverage	Universal Health Coverage increase in all countries, regions, and globally																																

\*Indicators with figures in orange are “off-track” to meet 2030 targets and with figures in blue are “on-track”.

†Estimates exclude deaths averted due to COVID-19 vaccination.

‡One region (47 countries) does not have a measles elimination target; two regions (68 countries) do not have a rubella elimination target.

### • Impact Goal 1.1: Number of future deaths averted through immunization

According to initial modelling<sup>5</sup>, an estimated 51.0 million deaths will be averted due to vaccinations administered between 2021 and 2030 against 14 pathogens, if vaccination targets are met. This figure has been recalculated based on 2021 coverage and introductions to date, as well as updated population estimates (Figure 2).

#### Take-home messages:

- 3.99 million future deaths were averted by vaccination against 14 key pathogens in 2021.
- The number of deaths averted in 2021 is 5.6% lower than initially targeted, representing an additional 240,000 future premature deaths from vaccine-preventable diseases.
- Modelling suggests that the largest proportion of future deaths averted is attributed to prevention of measles (39.6%), hepatitis B (29.2%) and pertussis (11.0%).
- The gap between observed and target numbers is driven primarily by lower than anticipated coverage rates for human papillomavirus vaccine (HPV), measles and hepatitis B, with variation across regions (Figure 3).
- Figures do not include deaths averted by COVID-19 vaccination (see below).

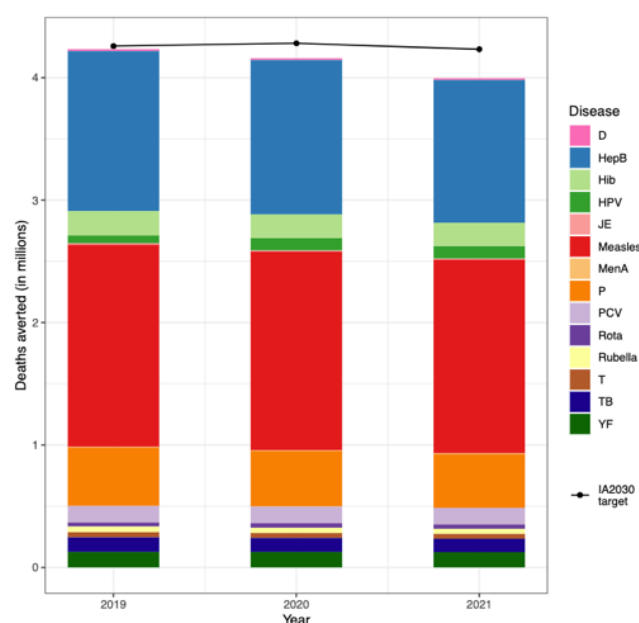


Figure 2. Estimated future deaths averted by vaccination against 14 pathogens in a given year. Numbers are derived from modelling based on actual coverage and IA2030 targets.

D: diphtheria; HepB: hepatitis B virus; Hib: *Haemophilus influenzae* type b; HPV: human papillomavirus; JE: Japanese encephalitis; MenA: *Neisseria meningitidis* serogroup A; P: pertussis; PCV: *Streptococcus pneumoniae*; Rota: rotavirus; T: tetanus; TB: tuberculosis (BCG); YF: yellow fever

<sup>5</sup> Carter A, Msemburi W, Sim SY, Gaythorpe KAM, Lindstrand A, Hutubessy RCW. Modeling the Impact of Vaccination for the Immunization Agenda 2030: Deaths Averted Due to Vaccination Against 14 Pathogens in 194 Countries from 2021-2030 (April 20, 2021). Available at SSRN: <https://ssrn.com/abstract=3830781> or <http://dx.doi.org/10.2139/ssrn.3830781>

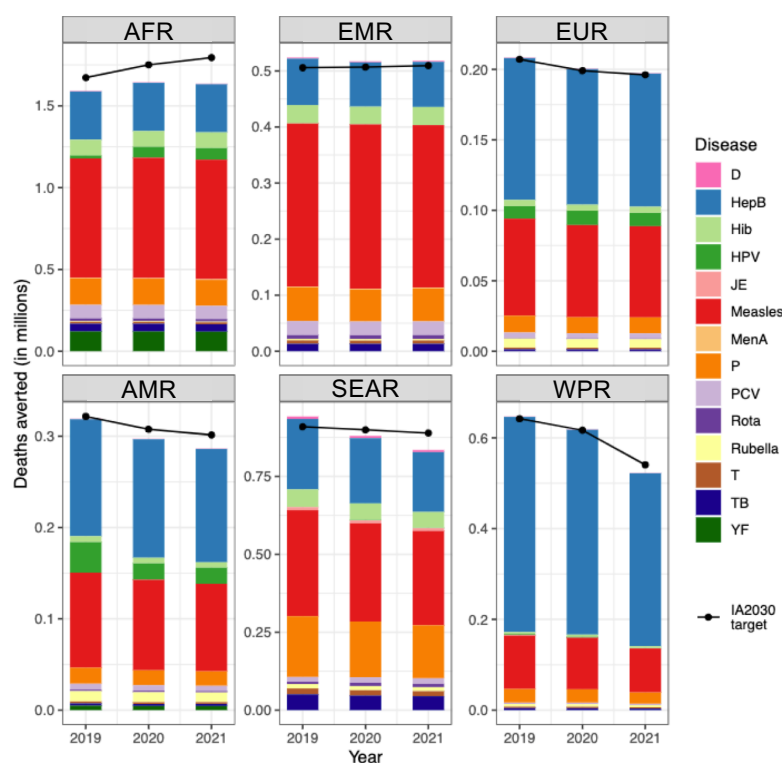


Figure 3. Estimated future deaths averted by vaccination against 14 pathogens in a given year broken down by region.

Further details can be found in Supplementary Document A. Future analyses will include a wider range of vaccine-preventable diseases.

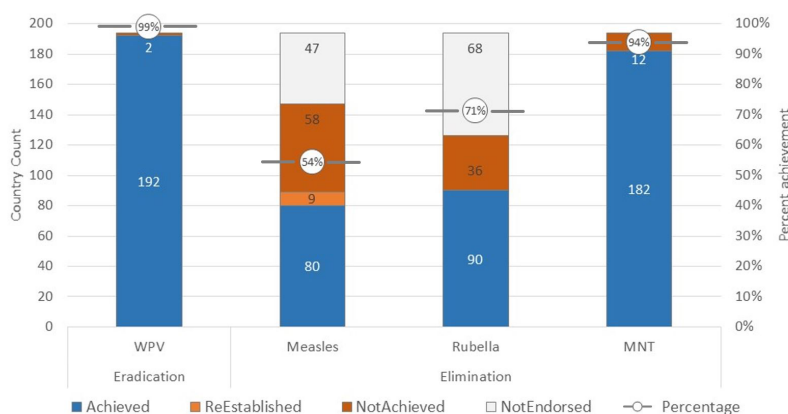
• **Impact Goal 1.2: Number and % of countries achieving endorsed regional or global VPD control, elimination and eradication targets (Figures 4, 5)**

*Take-home messages:*

- **Polio:** Polio remains endemic in two countries (Afghanistan and Pakistan); four cases of wild poliovirus were detected in Afghanistan and one in Pakistan in 2021 (compared with 56 and 84, respectively, in 2020).
- A case of wild poliovirus was reported in Malawi in February 2022. Sequence analysis suggested it was an import from Pakistan. No further cases have been detected in Malawi but a linked case was identified in Mozambique in May 2022 and by June 2022 three additional cases had been reported. In addition, a case of wild poliovirus was identified in Pakistan in April 2022, 15 months after the last case was detected.
- Growing numbers of circulating **vaccine-derived poliovirus (cVDPV) outbreaks** (see below) point to widespread deficiencies in poliovirus vaccine coverage.
- **Measles:** Only one region reported 2021 data on measles elimination status, making it difficult to track global progress towards this goal. Pre-2021, re-establishment of measles transmission is known to have occurred in nine countries; the true number may now be higher.
- **Maternal and neonatal tetanus:** As of the end of 2021, 12 countries had yet to eliminate maternal and neonatal tetanus (the same as in 2020).

- Overall, no visible progress has been made towards global and regional eradication and elimination targets since 2019.

The percentage of countries yet to achieve endorsed targets varies substantially across regions. The African and Eastern Mediterranean Regions have yet to endorse a regional elimination target for rubella, while the African Region is the only one without an endorsed elimination target for measles. Four regions have an endorsed target for all four vaccine-preventable diseases, but for three regions there is at least one disease for which more than 75% of the region’s countries have yet to achieve the endorsed target.



<sup>1</sup> Endorsed target date before 2030. For MNT the last endorsed target date was within the life-span of the GVAP (2015)

Figure 4. Status of eradication and elimination targets for wild poliovirus, measles, rubella, and maternal and neonatal tetanus in 2021, showing country counts and percentage of countries achieving endorsed target.

		Eradication	Elimination			
		WPV	Measles	Rubella	MNT	
<b>AFR</b>	Countries remaining (%)	0 (0%)	PE	PE	6 (13%)	<b>Regional target status</b> Achieved Not achieved Pending endorsement
<b>AMR</b>	Countries remaining (%)	0 (0%)	2 (6%)	0 (0%)	0 (0%)	
<b>EMR<sup>1</sup></b>	Countries remaining (%)	2 (10%)	18 (86%)	PE	5 (24%)	
<b>EUR</b>	Countries remaining (%)	0 (0%)	20 (38%)	4 (8%)	0 (0%)	
<b>SEAR</b>	Countries remaining (%)	0 (0%)	6 (55%)	9 (82%)	0 (0%)	
<b>WPR</b>	Countries remaining (%)	0 (0%)	21 (78%)	23 (85%)	1 (4%)	

PE = Pending endorsement of regional target  
<sup>1</sup>Three countries have been reported as having eliminated rubella but are not shown as the region has not endorsed a regional target.

Figure 5. Count and percentage of countries by WHO region that have not achieved the regional or global endorsed targets for either eradication or elimination in 2021.

• **Impact Goal 1.3: Number of large or disruptive VPD outbreaks (Figures 6, 7)**

*Take-home messages:*

- Based on data reported to WHO, the number of large or disruptive outbreaks increased in 2021 compared to the 2018–2020 baseline for circulating vaccine-derived polioviruses (cVDPVs), wild polioviruses and yellow fever, remained stable for cholera and meningococcus, and declined for Ebola viral disease (EVD) and measles.

- There were significant regional variations, with cVDPV and wild poliovirus outbreaks being concentrated primarily in the African and Eastern Mediterranean regions, and yellow fever and measles outbreaks primarily in the African region.
- It is likely that measles cases were still being under-reported in 2021 due to COVID-19-related factors. The numbers of cases reported in January–July 2022 exceeded the total number reported in the whole of 2021.
- The 2022 measles data provide an early warning of inadequate coverage and gaps in service delivery, resulting in significant numbers of vulnerable under-immunized children and an increasing risk of large or disruptive outbreaks.

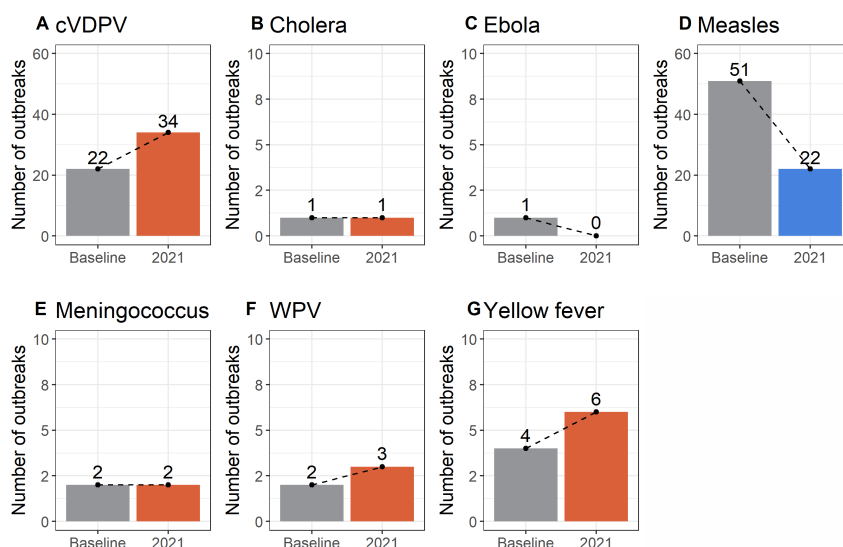


Figure 6. Global comparison of the number of large or disruptive outbreaks between baseline (average of 2018–2020) and 2021 for reported vaccine-preventable diseases. Red bars indicate worsening situation; blue bars indicate improving situation. Definitions of “large or disruptive outbreaks” can be found in the IA2030 Framework for Action. Not all countries are systematically reporting their cholera data to WHO.

		Cholera	cVDPV	Ebola	Measles	Meningococcus	WPV	Yellow fever
<b>AFR</b>	2021 (change from baseline)	1 (+1) ↑	23 (+9) ↑	0 (-1) ↓	18 (-1) ↓	2 (0) →	1 (+1) ↑	5 (+2) ↑
<b>AMR</b>	2021 (change from baseline)	0 (0) →	0 (0) →	0 (0) →	0 (-1) ↓	0 (0) →	0 (0) →	1 (0) →
<b>EMR</b>	2021 (change from baseline)	0 (0) →	7 (+3) ↑	0 (0) →	4 (-2) ↓	0 (0) →	2 (0) →	0 (0) →
<b>EUR</b>	2021 (change from baseline)	0 (0) →	3 (+2) ↑	0 (0) →	0 (-17) ↓	0 (0) →	0 (0) →	0 (0) →
<b>SEAR</b>	2021 (change from baseline)	0 (0) →	0 (-1) ↓	0 (0) →	0 (-2) ↓	0 (0) →	0 (0) →	0 (0) →
<b>WPR</b>	2021 (change from baseline)	0 (0) →	1 (-2) ↓	0 (0) →	0 (-6) ↓	0 (0) →	0 (0) →	0 (0) →

**Trend**    ↑ Increasing    ↓ Declining    → No change

Figure 7. Differences in the numbers of large or disruptive outbreaks between baseline (average of 2018–2020) and 2021 by vaccine-preventable disease and region.

IA2030 highlights and recognizes measles as a tracer of immunization programme performance; measles acts as an early warning system for deficiencies in coverage and system performance. First-dose measles vaccine coverage fell to 81% in 2021 (86% in 2019), the lowest level since 2008. An estimated 24.7 million children missed their first measles dose in 2021, 5.3 million more than in 2019. A further 14.7 million did not receive a second dose of measles vaccine. Following declines in 2020, the large pool of unvaccinated and under-vaccinated children is raising the prospect of additional deadly measles outbreaks in future years.

In November 2020, the type 2 novel oral polio vaccine (nOPV2) was granted an Emergency Use Listing (EUL) recommendation, and nOPV2 was introduced in 2021. nOPV2 is more genetically stable than mOPV2, making it significantly less likely to revert into a form which can cause paralysis in low-immunity settings. This means a reduced risk of seeding new cVDPV2 outbreaks (emergences) compared to mOPV2. After rising sharply in 2019, the number of cVDPV2 emergences has since fallen (Figure 8). While much work is needed to control ongoing cVDPV2 outbreaks, the declining numbers of emergences is an encouraging sign of the success of the new vaccination strategy.

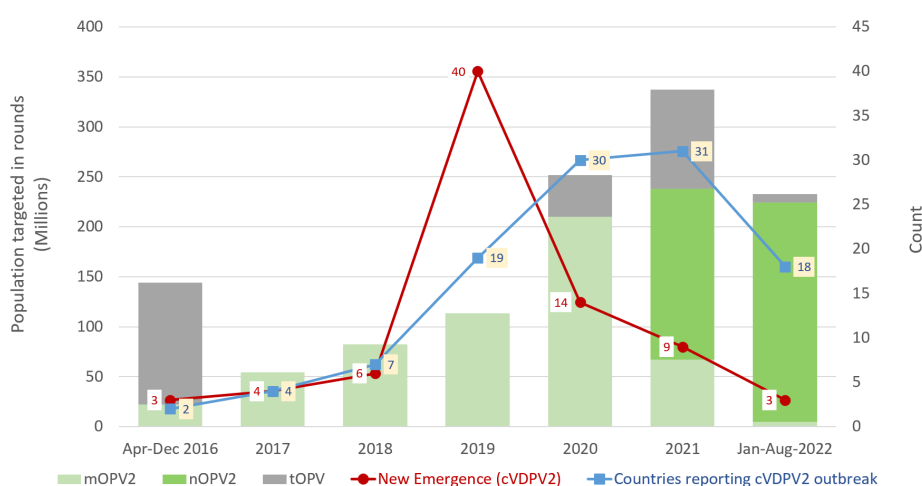


Figure 8. Trends in cVDPV2 emergence, large or disruptive outbreaks caused by cVDPV2, and use of different OPV.

The causes of the increase or decrease in outbreaks varies by disease:

- The rising number of cVDPV outbreaks stems largely from the decline in population immunity following discontinuation of type-2-containing oral polio vaccine (OPV) in 2016, plus new outbreaks linked to use of type-2-containing OPV in control efforts. However, new cVDPV type 1 and type 3 outbreaks continue to be generated following use of bivalent OPV (bOPV), emphasizing the critical importance of reaching vaccine coverage across all populations.
- The new occurrence of several wild poliovirus cases in Mozambique and Malawi, the first such cases in the African region since 2016, reflects an export of virus from Pakistan into settings with suboptimal polio vaccine coverage.
- The increase in yellow fever outbreaks is likely due to multiple factors, including the usual periodicity of virus transmission in forest settings, increasing population movement into at-risk areas, and gaps in vaccination that were exacerbated during the COVID-19 pandemic.
- The decline in measles outbreaks reflects the fact that many countries had their worst measles epidemics in more than a decade during the 2018–2020 baseline period and have subsequently seen significant declines in measles incidence resulting from high population immunity partly derived from widespread infections. In addition, COVID-19 control measures also reduced transmission of airborne diseases and measles surveillance was disrupted during the COVID-19 pandemic, likely leading to



under-reporting. Many African countries continue to have relatively high rates of endemic measles, exacerbated by reduced vaccination during the COVID-19 pandemic affecting new birth cohorts especially, leading to an increasing number of susceptible children.

- The decrease in the number and size of Ebola virus disease outbreaks reflects great progress in the rapid detection and containment of Ebola outbreaks in multiple African countries; individual cases have been detected but have not grown into large or disruptive outbreaks due to rapid and effective responses (see Section 5.1).
- The stability in cholera outbreaks reflects the impact of oral cholera vaccination outbreak response and preventive campaigns, as well as efforts to improve water and sanitation. However, multiple smaller outbreaks not reaching the threshold for “large or disruptive” occurred in 2021, alongside global shortages in oral cholera vaccine, raising concerns about future trends.

#### • **Impact Goal 2.1: Zero-dose children (Figures 9, 10)**

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#### *Take-home messages:*

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- The number of zero-dose children (children under one year of age not receiving DTP1) increased to 18.2 million, an alarming 37% increase over 2019.
- Almost two million more infants did not receive DTP1 than in 2020 and 4.9 million more were missed than in baseline year 2019.
- Multiple regions saw increases in the numbers of zero-dose children; almost all these children live in low- and middle-income countries, with numbers rising particularly sharply in the latter.
- A growing birth cohort, particularly in the African Region, is compounding declines in coverage.
- Catch-up efforts are urgently needed to protect children missing out on vaccination in 2021 (and in earlier years). Greater efforts are required to deliver immunization and other essential services to zero-dose and other under-immunized populations, based on an understanding of the root causes of under-immunization in different settings.

In 2021, persistent health system strains caused by the pandemic and compounded by the large-scale rollout of COVID-19 vaccine introduction likely contributed to the increase in zero-dose children. Additional contributory factors in some settings may have included waning vaccine confidence, fear of catching COVID-19 in health care settings, transport challenges, inadequate financing, poor human resource management and planning, and challenges related to providing immunization services in conflict or fragile settings.

Zero-dose children account for nearly three-quarters of under-immunized children and often belong to households that suffer from multiple deprivations (poverty, lack of access to clean water, sanitation) and experience gender barriers. These children are often missed by both routine immunization and campaigns. Delivering immunization and other essential healthcare services to such populations must therefore be a high priority.

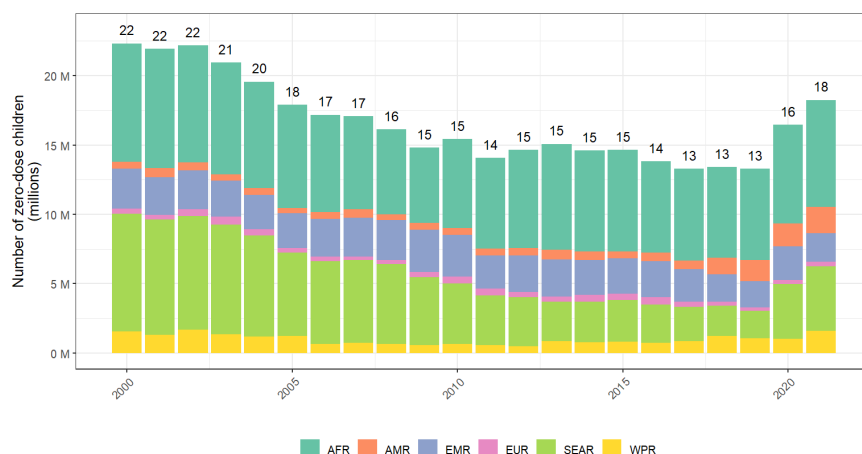


Figure 9: Trends in the numbers of zero-dose children (in millions) by WHO region.



Figure 10: Distribution of zero-dose children by region, showing actual (dark blue) and targeted (light blue) numbers of zero-dose children, and excess numbers seen in 2020 and 2021 (orange).

• **Impact Goal 2.2: Introduction of new or under-utilized vaccines in low- and middle-income countries (Figure 11)**

*Take-home messages:*

- Overall introductions reached an all-time high in 2021 because of COVID-19 vaccine introductions in 145 countries.
- Excluding COVID-19 vaccines, new vaccine introductions rose slightly in 2021 (25) compared to 2020 (17) but remain at historically low levels (Figure 11) – an average of 54 annual introductions were reported during 2011–2020.
- There is an urgent need to accelerate previously planned introductions, particularly for WHO universally recommended vaccines – HPV vaccine, pneumococcal vaccine, rotavirus vaccine, rubella vaccine and second dose of measles-containing vaccine (MCV2).

In 2020 and 2021, vaccine introductions, aside from COVID-19 vaccine introduction, fell to their lowest levels in 20 years as countries focused their efforts on sustaining essential health services and introducing COVID-19 vaccination.

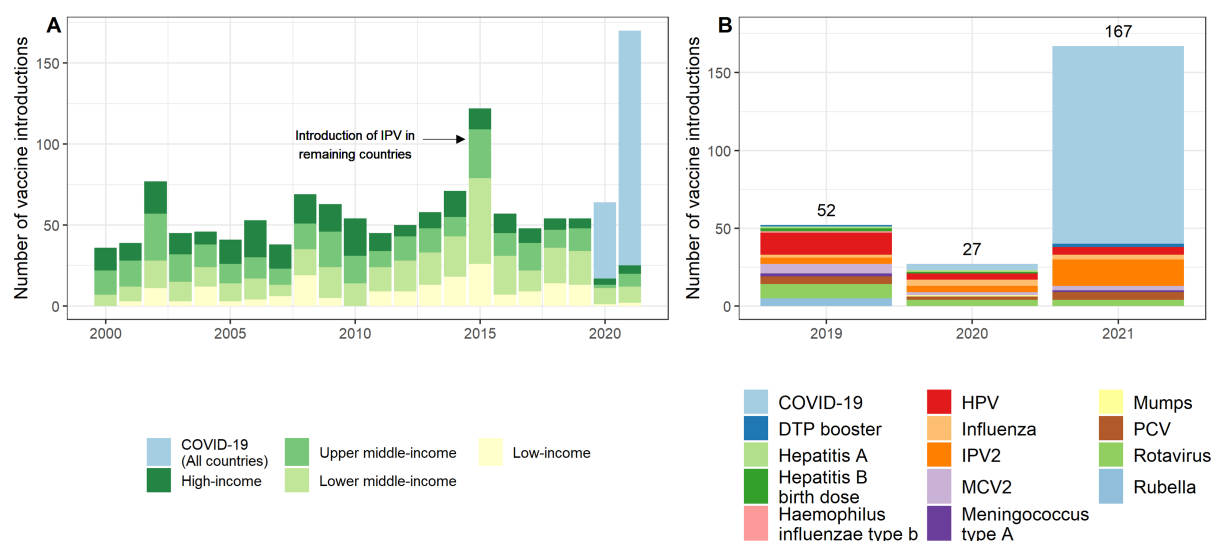


Figure 11: Left: New vaccine introductions, all countries, 2000–2021. Right: Introductions in low- and middle-income countries, 2019, 2020 and 2021.

Almost half of countries (45%) planned a vaccine introduction during 2021–2023. Of these, 45% reported delays in introductions, likely due to prioritization of COVID-19. Nevertheless, most countries (92%) are still planning to implement these introductions.

• **Impact Goal 3.1: Vaccination coverage across the life course: DTP3, MCV2, PCV3, HPVc (Figures 12, 13)**

*Take-home messages:*

- Coverage of two out of four indicator vaccines (DTP3 and MCV2) dropped further in 2021.
- Global HPVc and PCV3 coverage was unchanged, with new introductions and scale up in large countries offsetting drops in coverage elsewhere.
- All WHO regions experienced drops in immunization coverage, but the South-East Asia Region was most affected, for example seeing a 9% drop in DTP3 coverage since 2019.
- HPV vaccination of adolescent girls is critical for achieving cervical cancer elimination. Progress is still uneven across regions, and two-thirds of the global population still lacks access to this vaccine. New HPV introductions have also slowed since 2019, while disruption of HPV vaccination programmes, for example due to school closures, has contributed to a worrying downward trend in coverage.

Low- and middle-income countries experienced a larger setback than high-income countries, particularly countries that have transitioned out of Gavi support (reflecting marked drops in two large transitioned countries). This suggests that coverage gains remain fragile, and programmes in low- and middle-income countries are not yet as resilient to shocks as the stronger, longstanding programmes of high-income countries. Further details can be found in Supplementary Document B.

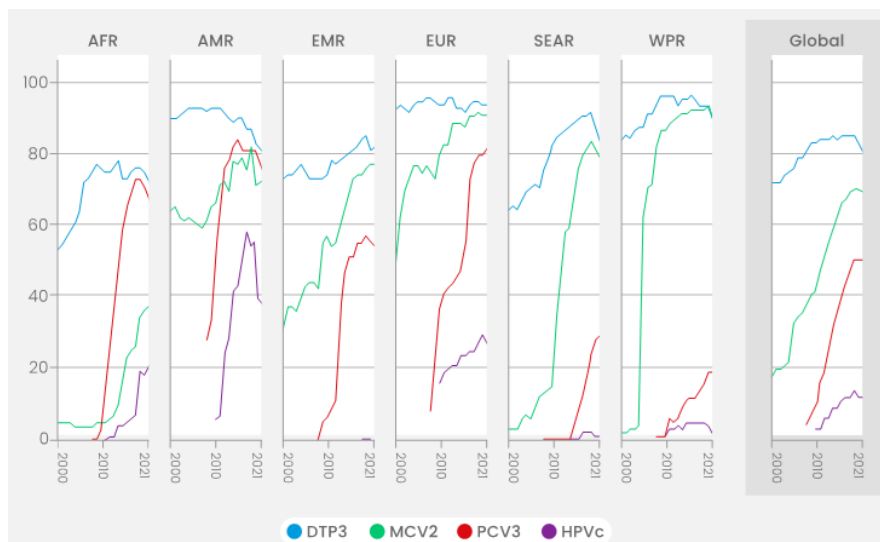


Figure 12: DTP3, MCV2, PCV3 and HPVc coverage by region.

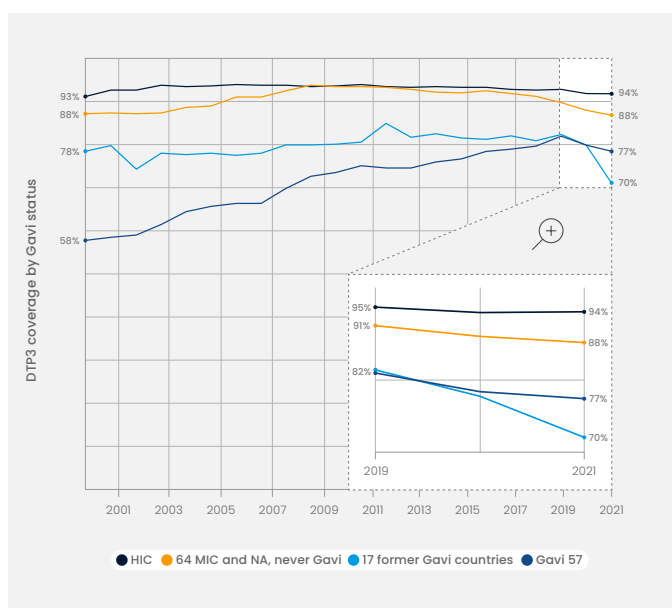


Figure 13: Changes in DTP3 coverage by World Bank country income grouping and Gavi status, 2000 to 2021.

• Impact Goal 3.2: UHC Service Coverage Index

Take-home messages:

- The baseline UHC Index of Service Coverage, a composite that measures the coverage of essential services, stood at 68 (out of 100) in the baseline year of 2019.
- Data for the index are not yet available for 2021, but Pulse survey data suggest continuing major disruption of essential health services in multiple countries.

The disruption to essential services caused by the COVID-19 pandemic in 2020 continued into 2021 (Figure 14) and affected all regions and countries of all income levels. For immunization, outreach services were most

likely to be disrupted, affecting efforts to reach under-immunized communities, which are typically more reliant on outreach services. The recovery of essential services remained uneven in 2021, with 117 of 127 countries (92%) reporting some degree of disruption in at least one essential health service between May and November 2021<sup>6</sup>. Countries reported continued disruptions to 45% of tracer services, with 57% of countries reporting disruption to routine scheduled primary care services and outreach.

Pulse survey results highlighted the main reasons underlying service disruptions. For routine primary health care services, the major reason was intentional modification of services, often due to cancelled sessions or sessions with insufficient health workers as many of the same health workers were conducting COVID-19 vaccination campaigns. Outreach activities were disrupted mainly because of lack of resources.

Lower-income countries continue to lag behind other countries. This was particularly evident in the African Region, which has the lowest UHC SCI index level, although progress continues to be made even in high-income countries<sup>7</sup>.

	Q3 2020 (Round 1)	Q1 2021 (Round 2)	Q4 2021 (Round 3)
Average disruption	56%	41%	44%
75-100% disruption	37%	13%	19%
50-74% disruption	23%	29%	26%
25-49% disruption	18%	26%	23%
Less than 25% disruption	11%	27%	21%
No disruption	11%	4%	11%

Denominator: 92 countries/territories responded to all three survey rounds and consented to data sharing agreement. The denominator represents the 89/92 countries that submitted a response on service disruption levels. Cumulative percentages may not add up to exactly 100% due to rounding.  
Services include: primary care, emergency, critical and operative care, rehabilitation, palliative care, cancer care, community care, and tracer services for reproductive, maternal, newborn, child and adolescent health and nutrition, immunization, communicable diseases, neglected tropical diseases, mental, neurological and substance use disorders, and care for older people

Figure 14: Percentage of countries reporting disruption of health services by extent of service disruption, based on WHO Pulse surveys.

## D.2 COVID-19 vaccination

### Take-home messages:

- 192 out of 194 WHO Member States had introduced COVID-19 vaccines by the end of 2021.
- An estimated 14 million deaths were prevented by COVID-19 vaccination within the first year of vaccination.
- Major regional disparities existed in COVID-19 vaccine coverage in 2021; these have begun to close in 2022.

<sup>6</sup> [https://www.who.int/docs/default-source/coronaviruse/final-ppt\\_global-ehs-pulse-survey-round-3\\_for-publication\\_7-feb-2022.pdf?sfvrsn=a49a8657\\_1&download=true](https://www.who.int/docs/default-source/coronaviruse/final-ppt_global-ehs-pulse-survey-round-3_for-publication_7-feb-2022.pdf?sfvrsn=a49a8657_1&download=true)

<sup>7</sup> WHO Regional Office for Africa. [Tracking Universal Health Coverage in the African Region 2022](https://www.afro.who.int/publications/tracking-universal-health-coverage-who-african-region-2022). <https://www.afro.who.int/publications/tracking-universal-health-coverage-who-african-region-2022>

As of 16 September 2022, there had been 607.7 million confirmed cases of COVID-19 and 6.5 million deaths. Based on excess death data, WHO estimates that the COVID-19 pandemic was responsible for an additional 14.9 million deaths in 2020 and 2021<sup>8</sup>.

Between December 2020 and December 2021, modelling suggests that vaccination may have prevented 14.4 million deaths from COVID-19 and excess mortality of 19.8 million deaths<sup>9</sup>. In 83 COVAX Advance Market Commitment countries, vaccination averted 7.4 million deaths (41% of the deaths that would have otherwise occurred). In 25 low-income countries that did not meet the 20% vaccination coverage target set by COVAX, an estimated additional 45% of deaths could have been averted had the target been met.

Although almost all countries had introduced COVID-19 vaccination by the end of 2021 (Figure 11), coverage varied significantly globally (Figure 15). Vaccine use in lower middle-income and low-income countries continued to lag that in high-income and upper middle-income countries (Figure 16), although the gap has closed slightly in 2022.

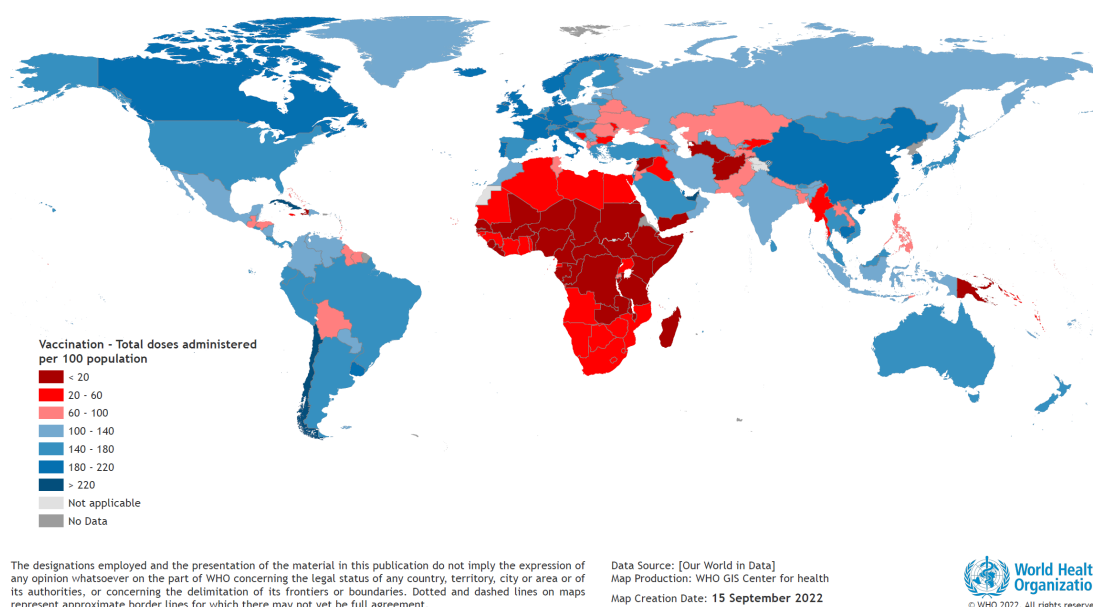
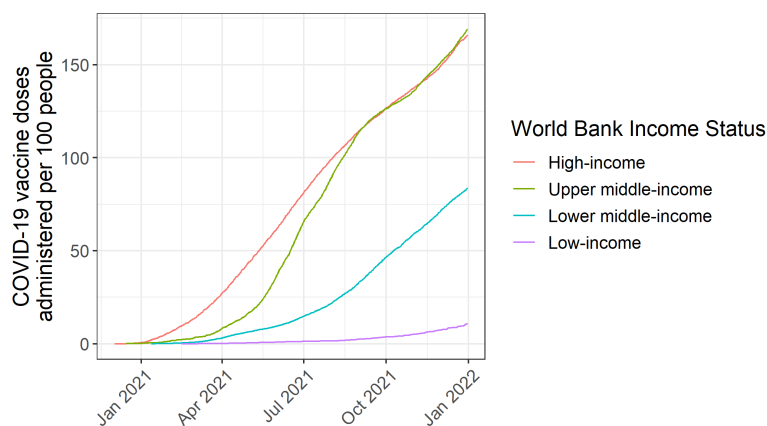


Figure 15: Total COVID-19 vaccine doses administered per 100 people as at the end of 2021.

<sup>8</sup> <https://www.who.int/data/stories/global-excess-deaths-associated-with-covid-19-january-2020-december-2021>

<sup>9</sup> Watson OJ, Barnsley G, Toor J, Hogan AB, Winskill P, Ghani AC. Global impact of the first year of COVID-19 vaccination: a mathematical modelling study. *Lancet Infect Dis.* 2022;S1473-3099(22)00320-6. doi: 10.1016/S1473-3099(22)00320-6.



Source: Our World in Data  
 Note: All doses, including boosters, are counted individually.

Figure 16: COVID-19 vaccine doses administered per 100 people, by income group, up to end of 2021.

### D.3 Strategic priority indicators

The **15 global strategic priority objectives indicators** (Table 2) are designed to track performance at all levels (country, regional and global), to help identify potential root causes of success and failure so that actions for improvement can be recommended. No global targets are provided for these indicators, due to wide country and regional variations. Regions and countries are encouraged to assess the baseline for each indicator and to consider setting targets for these indicators, based on guidance provided in Annex 1 to the IA2030 Framework for Action.

Table 2: Strategic Priority (SP) indicators and targets, baseline and 2021 data\*

Strategic Priority	Indicator	2021 data <i>Unless otherwise noted, 2021 is indicator baseline</i>						
<b>1</b> Immunization Programmes for Primary Health Care Universal Health Coverage	1.1 Proportion of countries with evidence of adopted mechanism for monitoring, evaluation and action at national and subnational levels†	Data forthcoming in 2022						
	1.2 Density of physicians, nurses and midwives per 10,000 population‡	<b>55.9</b> health workers per 10,000 population‡ (Physicians: 16.4, Nurses/midwives: 39.5) <i>2019 baseline: 56.4 (17.4 physicians and 39 nurses/midwives)</i>						
	1.3 Proportion of countries with on-time reporting from 90% of districts for suspected cases of all priority VPDs included in nationwide surveillance†	<b>43%</b> (20 out of 47 countries)						
	1.4 Proportion of time with full availability of DTP and MCV at service delivery level†	<b>31.5%</b> (55 for countries DTP and 57 for MCV) §						
	1.6 Proportion of countries with at least one documented (with reporting form and/or line-listed) individual serious adverse event following immunization (AEFI) case safety report per million total population	<b>26%</b> (51 out of 194 countries) <i>2019 baseline: 28% (54 out of 194)</i>						
<b>2</b> Commitment & Demand	2.1 Proportion of countries with legislation in place that is supportive of immunization as a public good†	<b>51%</b> (99 out of 194 countries)						
	2.2 Proportion of countries that have implemented behavioural or social strategies (i.e., demand generation strategies) to address under-vaccination†	<b>66%</b> (127 out of 194 countries)						
<b>3</b> Coverage & Equity	3.2 DTP3, MCV1, and MCV2 coverage in the 20% of districts with lowest coverage (mean across countries)	<b>63% DTP3, 63% MCV1, 49% MCV2</b> <i>2019 baseline: 67% DTP3, 66% MCV1, 53% MCV2</i>						
<b>4</b> Life Course & Integration	4.1 Breadth of protection (mean coverage for all WHO-recommended vaccine antigens)	<b>68%</b> <i>2019 baseline: 70%</i>						
<b>5</b> Outbreaks & Emergencies	5.1 Proportion of polio, measles, meningococcus, yellow fever, cholera, and Ebola outbreaks with timely detection and response	<b>28%</b> (7 out of 25 outbreaks) <i>average 2018-2020 baseline: 25%</i>						
<b>6</b> Supply & Sustainability	6.1 Health of vaccine markets, disaggregated by vaccine antigens and country typology	<table border="1"> <tbody> <tr> <td><b>Unhealthy</b></td> <td>BCG, hexavalent DTaP-IPV-Hib-Hep B (acellular pertussis-containing)</td> </tr> <tr> <td><b>Concerning</b></td> <td>HPV, PCV, pneumococcal polysaccharide, measles, measles-rubella, MMR</td> </tr> <tr> <td><b>Healthy</b></td> <td>Penta (whole-cell pertussis-containing), tetanus-diphtheria, IPV (stand-alone), rotavirus</td> </tr> </tbody> </table> <i>2019/2020 baseline: No changes except HPV moved from 'Unhealthy' to 'Concerning'</i>	<b>Unhealthy</b>	BCG, hexavalent DTaP-IPV-Hib-Hep B (acellular pertussis-containing)	<b>Concerning</b>	HPV, PCV, pneumococcal polysaccharide, measles, measles-rubella, MMR	<b>Healthy</b>	Penta (whole-cell pertussis-containing), tetanus-diphtheria, IPV (stand-alone), rotavirus
	<b>Unhealthy</b>	BCG, hexavalent DTaP-IPV-Hib-Hep B (acellular pertussis-containing)						
	<b>Concerning</b>	HPV, PCV, pneumococcal polysaccharide, measles, measles-rubella, MMR						
<b>Healthy</b>	Penta (whole-cell pertussis-containing), tetanus-diphtheria, IPV (stand-alone), rotavirus							
6.2 Proportion of countries whose domestic government and donor expenditure on primary health care increased or remained stable	Data expected in December 2022							
6.3 Proportion of low- and middle-income countries whose share of national immunization schedule vaccine expenditure funded by domestic government resources increased or remained stable¶	<b>62%</b> (23 out of 37 countries, 2020 to 2021) <i>2018-2019 baseline: 59% (22 out of 37)</i>							
<b>7</b> Research & Innovation	7.1 Proportion of countries with an immunization research agenda†	<b>12.8%</b> (23 out of 179 countries)						
	7.2 Progress towards global research and development targets	Data expected October 2022						

\* Table only includes SP objectives for which global indicators have been specified. Indicators highlighted in blue indicate a positive change from baseline and indicators in orange indicate a negative change from baseline.

† Indicators based on new eJRF questions piloted in 2021. Questions will be revised in light of lessons learned during piloting.

‡ 2020 data used because 2021 data is not yet available.

§ Analysis of first-year eJRF responses raise doubts about the validity of data (see SP1.4 Supply Chain below).

¶ Estimate excludes domestic expenditure on COVID-19 vaccination.



### • SP 1.1 Leadership, Management, Coordination

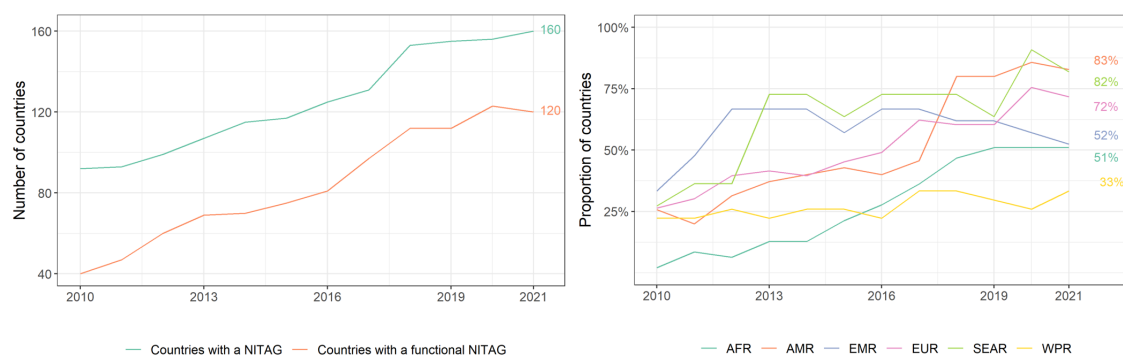
*Indicator: Proportion of countries with evidence of adopted mechanism for monitoring, evaluation and action at national and subnational levels*

#### Take-home messages:

- Data for this new indicator will be available later in 2022.
- The number of functional National Immunization Technical Advisory Groups (NITAGs) was 120 in 2021 (2019 baseline: 112), with only a small drop from 123 in 2020 despite immunization programme disruptions related to the COVID-19 pandemic (Figure 17).
- However, the overall encouraging global NITAG development trend hides significant regional variation. For instance, in the Western Pacific Region only a third of NITAGs meet functionality criteria, compared with more than 80% in the Americas and the South-East Asia Region.

NITAGs play a key role as independent expert bodies providing evidence-based advice to national immunization programmes. The past decade has seen remarkable progress in the number of NITAGs globally, which have increased from 92 in 2010 to 160 in 2021, 75% of them meeting six process criteria relating to NITAG functionality.

Since 2021 two new indicators have been added to better measure NITAG outputs and impact. Three-quarters of the NITAGs issued recommendations in 2021, and one or more recommendations were adopted by ministries of health for the same proportion of NITAGs.



*Figure 17: Left: Numbers of countries with NITAGs and functional NITAGs (achieving six process indicators relating to NITAG functionality). Right: Proportion of countries with a functional NITAG or equivalent in each WHO region.*

## • SP 1.2 Health Workforce

*Indicator: Density of physicians, nurses and midwives per 10,000 population*

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### *Take-home messages:*

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- In 2020, the latest years for which data are available, the density of physicians per 10,000 population was 16.4 (2019 baseline: 17.4) and the density of nurses and midwives was 39.5 (2019 baseline: 39).
- Successive WHO Pulse surveys identified lack of healthcare workers as the main bottleneck to the delivery of essential health services, including immunization<sup>10</sup>.
- The projected global shortage of healthcare workers remains large<sup>11</sup> but analysis of the latest workforce data (from 2020) suggests it is falling<sup>12</sup>.
- Major global inequities exist in healthcare worker numbers (Figures 18, 19), with health worker shortages in the WHO African Region projected to constitute 52% of the global shortage by 2030.

In 2016, the Global Strategy on Human Resources for Health<sup>11</sup> projected a global shortage of 18 million health workers by 2030. An analysis of the most recent data (for 2020) from the National Health Workforce Accounts (NHWA)<sup>12</sup> revealed:

- A total stock of 65 million health workers globally, an increase of 14 million over 2013.
- A drop in the global shortfall from 18 million to 15 million, and a projected further drop to 10 million by 2030.
- Significant regional disparities still exist, with the African and Eastern Mediterranean Regions accounting for 53% of the global shortage in 2020; these inequities are projected to increase, with these two regions projected to account for 72% of the global shortage by 2030.
- The 47 countries identified by WHO as having the lowest health workforce density and lowest universal health coverage (based on the UHC Service Coverage Index), which are included in the WHO Support and Safeguard list<sup>13</sup>, are projected to bear 69% of the global workforce shortage by 2030.

Because of geographical disparities in progress and rapid population growth, the WHO African region is projected to account for 52% of the global health worker shortage by 2030, up from a quarter in 2013. Regional inequities are high, although they have improved slightly; in 2020, high-income countries had a density of health workers 6.5 times that of low-income countries (compared with 7.6 times greater in 2013).

COVID-19 revealed three main challenges for immunization: lack of sufficient health workers to roll-out COVID-19 immunization; potential impacts of mobilization of health workers for COVID-19 vaccination on other immunization services; and suboptimal vaccination of health workers, for example due to lack of vaccine availability or vaccine hesitancy.

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<sup>10</sup> <https://apps.who.int/iris/handle/10665/334048>; <https://apps.who.int/iris/handle/10665/340937>; <https://apps.who.int/iris/handle/10665/351527>

<sup>11</sup> WHO. Global Strategy on Human Resources for Health: Workforce 2030. 20116. Geneva: WHO. Available at: <https://apps.who.int/iris/bitstream/handle/10665/250368/9789241511131-eng.pdf>

<sup>12</sup> Boniol M, Kunjumen T, Nair TS, Siyam A, Campbell J, Diallo K. The global health workforce stock and distribution in 2020 and 2030: a threat to equity and 'universal' health coverage? *BMJ Glob Health*. 2022 Jun;7(6):e009316. doi: 10.1136/bmjgh-2022-009316.

<sup>13</sup> WHO. Health workforce support and safeguards list, 2020. World Health Organization 2021. <https://cdn.who.int/media/docs/default-source/health-workforce/hwf-support-and-safeguards-list8jan.pdf>

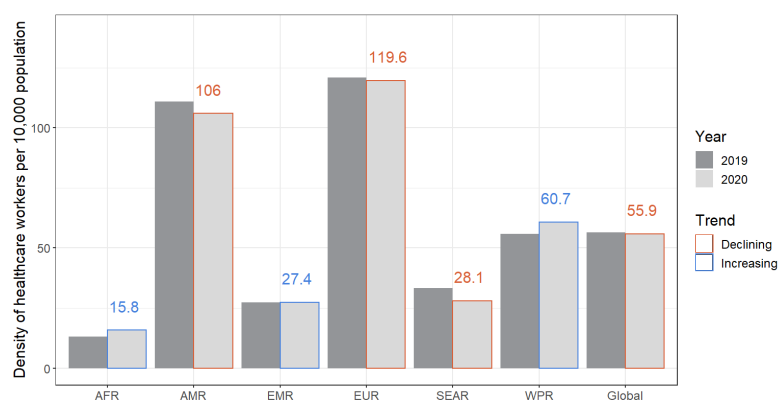


Figure 18: Density of health workers per 10,000 total population (2020 data).

The unequal distribution of health workers poses challenges to global COVID-19 vaccination objectives. An analysis of the health workforce requirements to reach 70% global coverage from 1 January 2022 to mid-2022 showed that several countries would have insufficient domestic resources; 29 countries would have had to mobilize more than 20% of their entire health worker staffing to attain this objective<sup>14</sup>.

The recommendations of the Global Strategy on Human Resources for Health remain relevant, and investing in health and care workers must be a priority. As part of these global efforts, the need to strengthen the public health and emergency workforce is critical<sup>15</sup>.

During the COVID-19 pandemic, the health workforce faced immense mental health stress, burnout and attrition. They also face some of the greatest risk of infection. Data from the International Council of Nurses suggests that, while health workers represent less than 3% of the global population, they represent around 14% of COVID-19 cases<sup>16</sup>. In some countries, the proportion can be as high as 35%. To facilitate actions to protect health and care workers and safeguard their rights, the WHO has developed a global health and care worker compact<sup>17</sup>.

The sector is also characterized by large gender pay inequalities. Globally, women earn 24% less than men in the health and care sector, a greater differential than in other sectors, even though they account for 67% of health and care workers worldwide<sup>18</sup>. This could have significant implications for health worker recruitment and retention.

Further details can be found in Supplementary Document C.

<sup>14</sup> Boniol M, Siyam A, Desai S *et al*. Estimating the health workforce requirements and costing to reach 70% COVID-19 vaccination coverage by mid-2022: a modelling study and global estimates *BMJ Open* 2022;12:e063059. doi: 10.1136/bmjopen-2022-063059

<sup>15</sup> Mosam A, Fisher DA, Hunter MB WHO Roadmap For Public Health and Emergency Workforce Working Group, *et al*. Public health and emergency workforce: a roadmap for WHO and partner contributions. *BMJ Global Health* 2022;7:e009592. <http://dx.doi.org/10.1136/bmjgh-2022-009592>

<sup>16</sup> <https://www.icn.ch/news/greatest-threat-global-health-workforce-hshortage-international-council-nurses-international>

<sup>17</sup> <https://www.who.int/publications/m/item/carecompact>

<sup>18</sup> International Labour Organization and WHO. The gender pay gap in the health and care sector: A global analysis in the time of COVID-19. 2022. [https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS\\_850968/lang--en/index.htm](https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_850968/lang--en/index.htm)

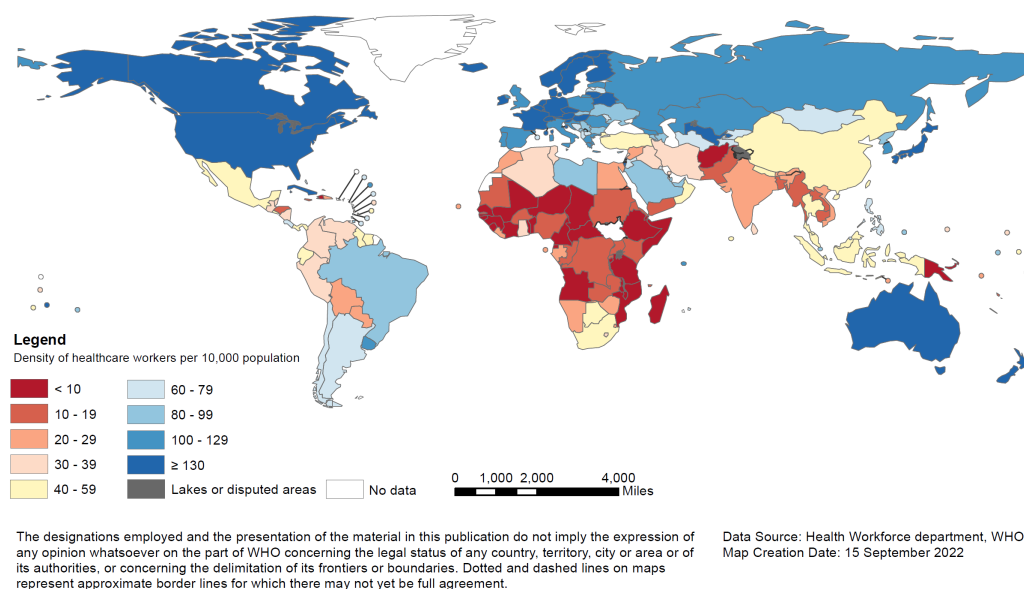


Figure 19: Density of health workers per 10,000 total population (2020 data).

### • SP 1.3 Comprehensive VPD Surveillance

*Indicator: Proportion of countries with on-time reporting from 90% of districts for suspected cases of all priority VPDs included in nationwide surveillance*

#### *Take-home messages:*

- This new indicator was piloted in 47 countries.
- Of 40 responding countries, less than half (43%) had received timely reports from at least 90% of their districts (Figure 20).
- Completeness of reporting (90% complete from 90% of districts) was higher (53%).
- 2021 data point to the need for strengthening of surveillance systems in multiple countries that piloted this new indicator.

Timely identification, investigation, confirmation and reporting, including timely reporting of non-occurrence of cases (“nil reporting”), are core disease surveillance functions. Timeliness of surveillance reporting is thus a tracer of surveillance system performance.

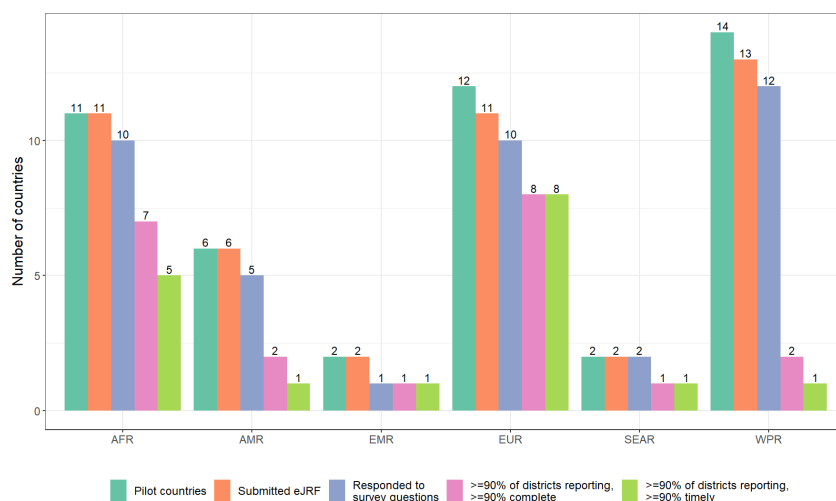


Figure 20: Numbers of pilot countries with complete and timely reporting of surveillance data.

Of the 40 responding countries, 21 (53%) countries had at least 90% of their districts sending in reports (completeness), with values ranging from 17% to 100% between WHO Regions. For timeliness, 17 (43%) countries had at least 90% of their districts reporting on time, with a range between WHO Regions of 8% to 100%. Only nine countries in total (22.5%) met both completeness and timeliness criteria. Further details can be found in Supplementary Document D.

The data point to some shortcomings in the surveillance systems in pilot countries. It is likely that surveillance activities for vaccine-preventable diseases were disrupted in many countries by redeployment of surveillance officers and laboratory staff to COVID-19 responses. Globally, polio surveillance data suggest some declines in AFP surveillance in 2021<sup>19</sup>. Monitoring of this indicator, for example quarterly, and triangulation with other data sources, such as acute flaccid paralysis (AFP) reporting, will enable countries to identify potential declines in surveillance performance.

#### • SP 1.4 Supply Chain

*Indicator: Proportion of service delivery points with full availability of DTP and MCV*

#### *Take-home messages:*

- This indicator was introduced for 2021. Analysis of first-year data suggests that there are issues with its interpretation within countries.
- Data on district-level stockouts show a generally decreasing trend over recent years in most regions (Figure 21).

To effectively assess this indicator, countries need to have a functional system to monitor and report vaccine supply availability at the service delivery level during each resupply cycle. However, the data appear to provide an unrealistic picture of stock availability and are not consistent with the results of recent Effective Vaccine Management (EVM) assessments carried out in nine countries. Further discussions will be held in order to

<sup>19</sup> Wilkinson AL, Diop OM, Jorba J, Gardner T, Snider CJ, Ahmed J. Surveillance to Track Progress Toward Polio Eradication - Worldwide, 2020-2021. *MMWR Morb Mortal Wkly Rep.* 2022;71(15):538-544. doi: 10.15585/mmwr.mm7115a2.

refine the indicator and ensure it is understood by countries. Further details can be found in Supplementary Document E.

Historical data are available on the number of countries reporting district-level stockouts for any vaccine (Figure 21). These data show a decline over time in the number of countries reporting stockouts.

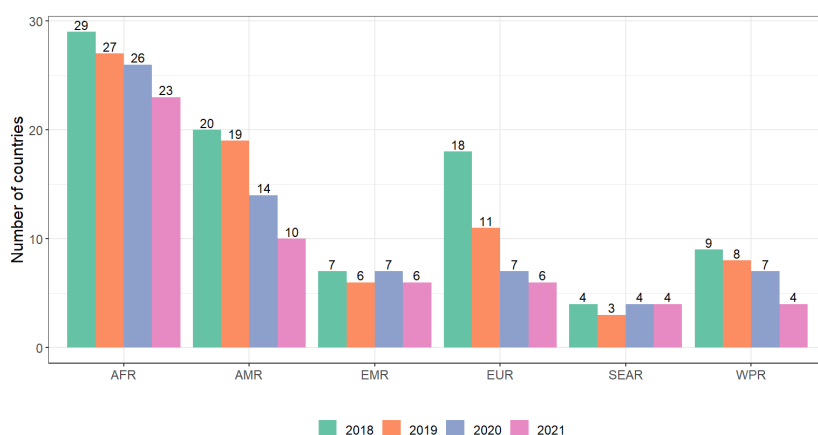


Figure 21: Number of countries reporting district-level stockouts, by WHO region.

#### • SP 1.5 Immunization information

*No indicator.*

The use of quality data to guide the implementation lies at the heart of IA2030. Quality data – data that is timely and fit for purpose – will only be available and used if the paradigm is switched from “collecting data” towards creating a “culture of data use” that starts at the health facility level. For quality data to be used to support operational, managerial and strategic decision-making at all levels, it is necessary to focus not only on technology but also on the people (capacity and capability), processes and enabling environments necessary for functional information systems.

The COVID-19 pandemic showed that the availability of timely data, appropriately analysed, can guide decision-making and rapid adaption to evolving needs. It also highlighted that most of the traditional information systems that aggregate data from vaccination posts are insufficient to monitor vaccination uptake and coverage by several variables of interest, such as age, presence of co-morbidities and even sex. Uncertainties related to the size of various target populations (denominators) make calculation of actual coverage very challenging. Similar challenges limit the ability to measure and monitor the impact that collective actions are having on immunization programme recovery and closing of immunity gaps.

Following the recommendations for a Data Working Group endorsed by SAGE in 2019, and with extensive consultation and informed by the lessons learned from COVID-19, the IA2030 [Immunization] Data Action Framework (DAF) was published in 2021<sup>20</sup>. This framework is based on the principle that sustainable improvements in immunization and surveillance data quality and use will require efforts across the health system – governance, people, tools and processes, including use of data for continuous quality improvement (CQI) – and that the approaches need to be context-specific, country-owned and driven from the frontline up.

<sup>20</sup> [http://www.immunizationagenda2030.org/images/documents/IA2030\\_Data\\_Action\\_Framework\\_-\\_FINAL\\_format\\_210630.pdf](http://www.immunizationagenda2030.org/images/documents/IA2030_Data_Action_Framework_-_FINAL_format_210630.pdf)

DAF is the IA2030 roadmap to guide advocacy, investments and technical guidance related to strengthening the generation of timely quality data and promoting data use to reach IA2030 goals and targets.

The IA2030 Data Strengthening and Use Working Group is developing a set of indicators related to information systems and data use. These indicators will be tailored to different country grouping, depending on factors such as the maturity of information systems and issues with data quality, and will help monitor progress in at least two key outcomes:

- Strengthened immunization programme monitoring to sustain effective and resilient immunization programmes for the life-course.
- Actionable insights used to inform planning, from updating local micro-plans to detect drivers of and gaps in coverage and assess reach across the life-course.

Further details can be found in Supplementary Document F.

### • SP 1.6 Vaccine Safety

*Indicator: Proportion of countries with at least one documented (with reporting form and/or line-listed) individual serious adverse event following immunization (AEFI) case safety report per million total population*

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#### *Take-home messages:*

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- 51 out of 194 countries (26%) met the criteria for this indicator in 2021 (2020 baseline: 54).
- Major efforts will be needed to help countries transition to case-based data sharing.

Sharing of AEFI data between stakeholders within a country is critical to ensure that safety signals are identified on time and appropriate responses are initiated. Past reporting has been based on sharing aggregate data (the total number of AEFIs), which provided information on the “minimum functionality” of a country’s AEFI surveillance system. Most countries have now achieved this minimum functionality for all vaccines in their immunization schedules, including COVID-19 vaccines.

However, summary data do not provide details that are critical for programme managers and policymakers (such as the vaccines administered, types of adverse events, age, gender, location, pregnancy status and other parameters). Hence, the next step will be to enhance vigilance systems to permit identification of signals and trends that can trigger further investigation.

Furthermore, if countries share individual case-safety reports (ICSRs) rather than aggregate information, then it is possible to analyse those AEFIs, leading to key learnings and preventive actions. Furthermore, when pooled into a global database, ICSRs can provide valuable insights into trends and regional characteristics of very rare but significant AEFIs that may be difficult to detect through national aggregate data. The WHO Program for International Drug Monitoring (WHO PIDM) provides a platform and a global database, VigiBase, for countries, regions and territories to share ICSRs. As of August 2022, there are 151 members (sharing ICSRs) and 21 associate members (preparing to share ICSRs) in the WHO PIDM.

In December 2020, the Global Advisory Committee on Vaccine Safety (GACVS) recommended adopting a new indicator of “at least one documented individual serious AEFI reported by a country (in a reporting form and/or linelist) per million total population in VigiBase, the WHO global database of ICSRs”. At present only 51

countries meet this new indicator (Figure 22). Except for the European Region, major efforts will be needed to help countries transition to case-based data sharing. GACVS has advised that the previous indicator, of reporting aggregated data, should continue until all countries are able to transition to the new indicator.

Further details can be found in Supplementary Document G.

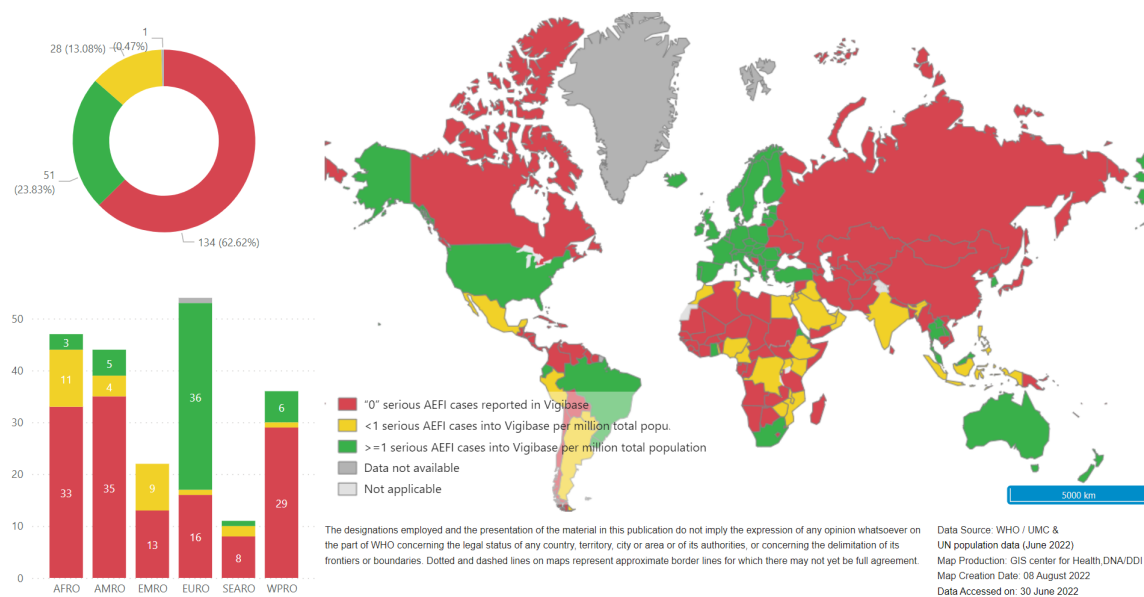


Figure 22: Countries reporting serious AEFI cases into VigiBase per million total population in 2020.

### • SP 2.1 Commitment

Indicator: Proportion of countries with legislation in place that is supportive of immunization as a public good

#### Take-home messages:

- 99 out of 194 (51%) of countries reported having legislation in place that is supportive of immunization as a public good in 2021 (Figure 23).
- Findings were varied across WHO Regions, with the highest proportion in the WHO European Region (69%), followed by the Eastern Mediterranean Region (57%), and the fewest lowest proportion in the South-East Asian Region (27%).
- No major differences were found when data were broken down by income classification or by DTP3 coverage.
- The data point to a continuing need to promote further strengthening of political commitment to immunization.



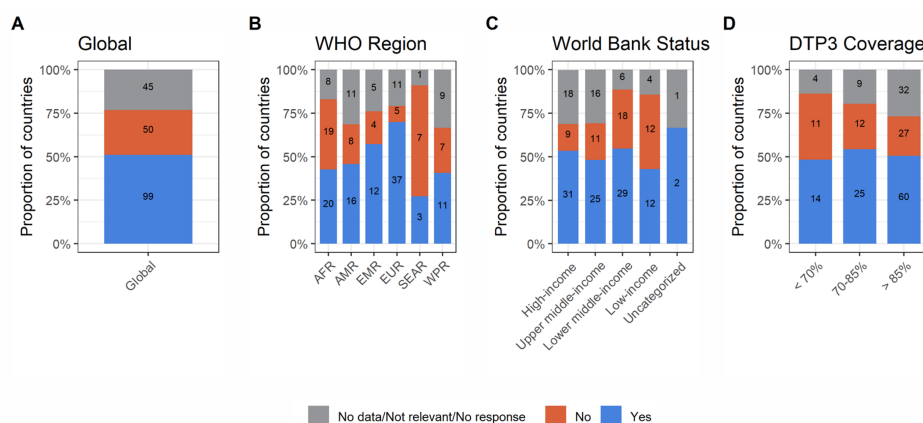


Figure 23: Proportion of countries reporting that legislation is in place that is supportive of immunization as a public good.

• SP 2.2 Demand

Indicator: Proportion of countries that have implemented behavioural or social strategies (i.e. demand-generation strategies) to address under-vaccination

Take-home messages:

- 127 out of 194 (66%) of countries reported having implemented behavioural or social strategies to address under-vaccination (Figure 23).
- Findings were relatively consistent across all WHO Regions, ranging from 51% in the European Region and 52% in the Western Pacific Region, through to 91% in the South-East Asian Region.
- Implementation of behavioural or social strategies was reported by 86% of low-income countries and 85% of lower-middle-income countries, but only 45% of high-income countries and 60% of upper-middle-income countries.
- Countries with lower DTP3 coverage were more likely to have implemented behavioural or social strategies.
- Opportunities exist to promote greater use of behavioural or social strategies by countries; efforts are also needed to assess the effectiveness of these strategies.

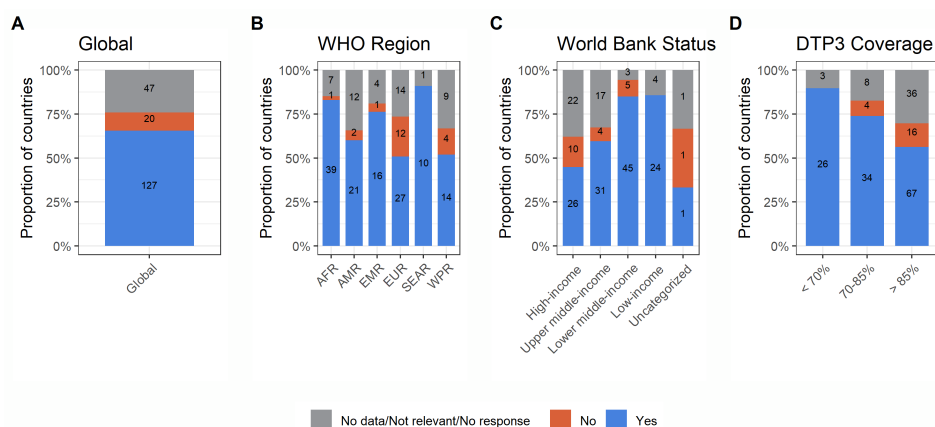


Figure 24: Proportion of countries reporting having implemented behavioural or social strategies.

Behavioural or social strategies encompass community engagement (55% of countries), digital or social listening (49%), behaviourally informed interventions (42%), public communications (62%), and service quality interventions (47%). A comprehensive range of strategies are required to achieve high uptake, to be informed by meaningful engagement with civil society and community representatives, as well as local data on behavioural and social drivers. In addition, 27% of countries reported having carried out an assessment of reasons for under-vaccination, and 23% included measures of behavioural and social drivers.

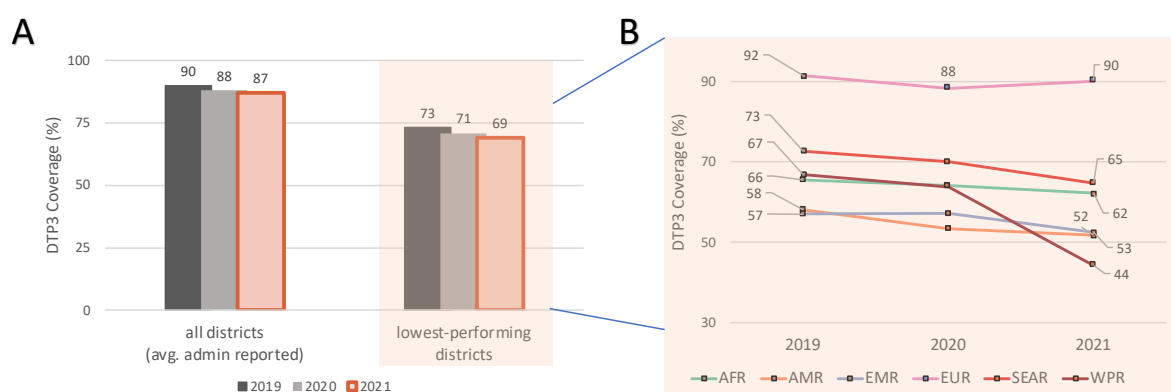
Many countries are using a range of tools to assess social and behavioural drivers of vaccine uptake. These have largely focused on COVID-19 vaccination, with some countries also integrating questions related to routine immunization in their survey/study tools. The COVID-19 vaccine confidence tracker has been used to monitor demand for COVID-19 vaccination.

### • SP 3.2 Equity

*Indicator: DTP3, MCV1, and MCV2 coverage in the 20% of districts with lowest coverage (mean across countries)*

#### *Take-home messages:*

- In 2021, the gap between the lowest-performing quintile of districts and national averages remained large.
- In some regions, DTP3 coverage in the lowest-performing districts is only slightly more than 50% (Figure 25).
- Inconsistencies in data reporting over time in some countries introduce some challenges to data interpretation.
- The data suggest that limited if any progress has been made in closing equity gaps since 2019 – averaged across all countries, the difference in coverage between the lowest-performing districts and national coverage was 18% in 2021 compared with 17% in 2019 (Figure 25).



*Figure 25: A: Average DTP3 coverage and coverage in lowest-performing districts in 102 countries that have provided data every year since 2019. B: Regional breakdown of coverage over this period.*

#### • SP 4.1 Life-course – Breadth of Protection

Indicator: Mean coverage for all WHO-recommended vaccine antigens

#### Take-home messages:

- Mean coverage globally fell again in 2021, to 68% (2019 baseline: 70%).
- Coverage has been sustained in the European and Eastern Mediterranean Regions but has fallen elsewhere.
- The data further highlight the need to revitalize immunization programmes, to strengthen delivery platforms across the life-course, and to push forward with delayed vaccine introductions.

Breadth of protection is a cross-sectional programme performance indicator, defined as the average global coverage achieved for a set of globally recommended antigens used across multiple age ranges (Figure 26). After reaching a peak in 2019, mean coverage globally declined in 2020 and 2021. Although the drops in 2020 and 2021 are relatively small, they follow many years of sharply rising coverage following the introduction of new vaccines since 2000. Coverage of these vaccines has stagnated at relatively low levels or begun to decline.

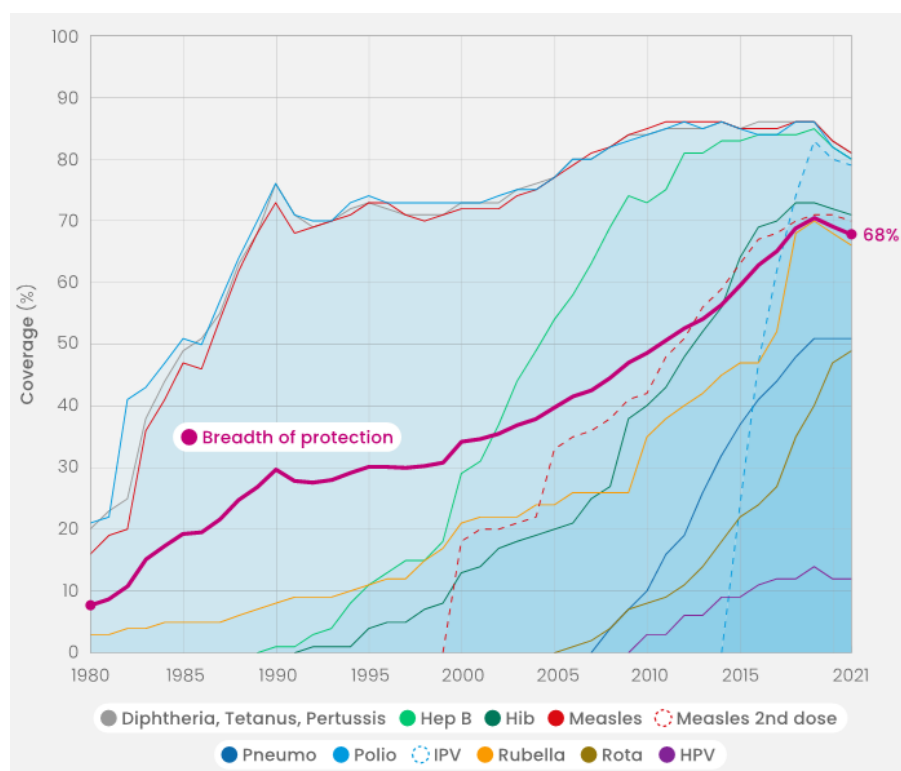


Figure 26: Trends in coverage for breadth-of-protection indicators 1980–2021.

Although breadth of protection was highest in the Region of the Americas in the 2010s, coverage in this region has shown the largest recent falls and average coverage is now lower than in the European Region (Figure 27). Across all country income classification categories, breadth of protection declined from 2019 to 2021. Further details can be found in Supplementary Document H.

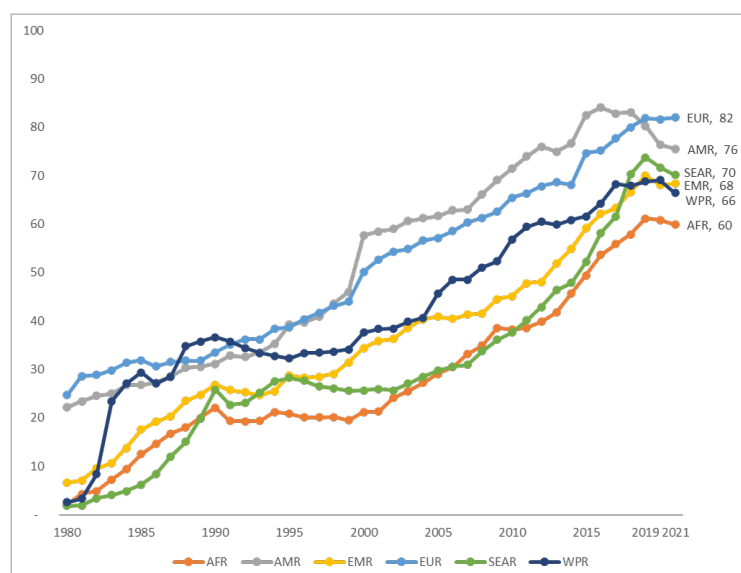


Figure 27: Trends in breadth-of-protection average coverage 1980–2021 by region.

### • SP 5.1 International outbreak responses

*Indicator: Proportion of polio, measles, meningococcus, yellow fever, cholera and Ebola outbreaks with timely detection and response*

#### *Take-home messages:*

- There were 29 outbreaks with outbreak response vaccination campaigns that received vaccines, funding or other support from international organizations in 2021 (Figure 28).
- The number of measles, meningococcus, Ebola and yellow fever outbreaks rose in 2021 in comparison to baseline (2018–2020 average), from 25 to 29.
- The proportion of timely outbreak responses showed a small improvement over baseline, from 25% to 28%.
- Within this overall pattern, there was considerable variation in timely detection and response by disease: criteria were met for three out of three Ebola viral disease (EVD) responses, three out of six yellow fever responses, one out of 10 cholera responses, zero out of three measles responses, and zero out of three meningococcus responses. Wild poliovirus and cVDPV outbreaks will be reported in subsequent years.
- Data apply to globally supported outbreak responses. Outbreak responses conducted entirely with national resources are not captured here, and patterns may differ from those described.
- While some global outbreak response systems appear to be functioning well, there is considerable scope to enhance the timeliness of responses to multiple important vaccine-preventable diseases.

Efforts to prevent and control EVD, yellow fever, cholera, meningococcus and measles have placed a high priority on improving preventive and outbreak response vaccination as well as disease surveillance, and have often benefited from strong political support in affected countries.

EVD and yellow fever outbreak detection and response efforts have benefited from a number of additional factors, including the rapid use of vaccine already available in affected countries before additional global

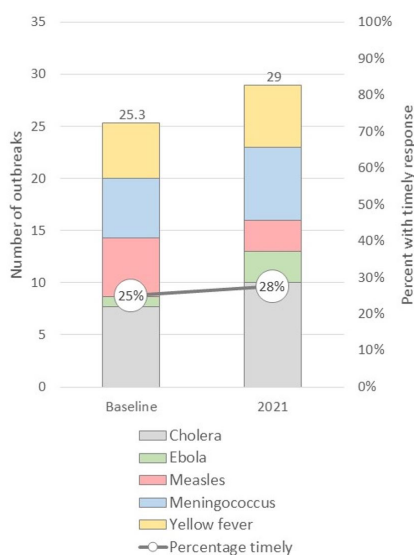
support was mobilized and clear thresholds for initiating outbreak responses pegged to the detection of specified numbers of cases. For example, a single case of EVD is always sufficient to trigger a globally supported outbreak response vaccination campaign.

By contrast, cholera, meningococcal and measles outbreak responses are tied to the detection of a greater number of cases than expected over a given time period. It can take some time for a national government to conclude that this criterion has been met. The logistics of vaccine distribution internationally and in country can add further delays, so use of vaccine already present in affected countries can substantially accelerate responses.

More broadly, the importance of rapid recognition of outbreaks and the initiation of campaigns based on in-country vaccine stocks both illustrate the central importance of country public health capacity in detecting and responding to vaccine-preventable disease outbreaks.

The challenges involved in timely outbreak detection and response underscore the importance of preventing outbreaks through: routine yellow fever, meningococcus, and measles routine immunization; cholera, yellow fever, meningococcus and measles preventive vaccination campaigns and other responses; and improvements to water and sanitation to limit the transmission of cholera. In addition, root cause analyses of outbreaks can suggest what actions can be taken to prevent their recurrence.

The relatively low proportion of outbreak responses that met timely outbreak detection and response criteria also indicates that there is considerable scope for improving the detection of vaccine-preventable disease outbreaks and globally supported responses to those outbreaks.



*Figure 28: Number of outbreaks triggering a global vaccination response and percentage of timely responses. Baseline outbreak count is the average number of outbreaks for 2018–2020 (broken down by disease); the percent is the average number with timely responses for the same time period (across all diseases).*

## • SP 5.2 Emergencies

No global indicator

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### *Take-home messages:*

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- Nearly one billion people are living in fragile and conflict-affected states.
- An estimated 40% of unvaccinated and under-vaccinated children live in countries that are either partially or entirely affected by conflict.
- Key issues to address include the appropriate vaccines to deliver in emergency settings and the age range of recipients.

In 2020, it was estimated that nearly one billion people were living in fragile and conflict-affected states. The 2022 Fragile States Index, which provides data for 2021, reported the five most fragile countries were Yemen, Somalia, Syria, South Sudan and the Central African Republic, but the countries that worsened the most during 2021 were, in order of greatest decline, Myanmar, Afghanistan, Burkina Faso, Lebanon, Haiti and Guinea<sup>21</sup>.

UNICEF has estimates that approximately 44% of unvaccinated and under-vaccinated children lived in countries that are either partially or entirely affected by conflict<sup>22</sup>. The main barriers to immunization in humanitarian and conflict settings include insecurity due to active fighting or its aftermath, mistrust and allegiance to clanship rather than the state, inadequate human resources for health, population displacements, destruction of health facilities, disruption of financial systems, and inability to remunerate health workers<sup>23</sup>.

Managing immunization services under such conditions requires concerted efforts to address the challenges. Initiatives include negotiating a truce with the leaders of armed groups to allow access, giving incentives to health workers and employing innovative payment schemes through mobile money<sup>24</sup>, and establishing resilient health systems that can withstand the initial shocks of disasters and conflict. This latter point highlights the need for training of multiskilled health workers who can quickly adapt to changing situations and solarization of health facilities so that they are able to withstand supply chain disruptions. Humanitarian and development support should be offered together such that system building is not delayed until the end of the crises, since these now take longer to resolve than previously<sup>25</sup>.

There are a range of mechanisms for releasing resources for system building, resilience, and improvement of processes. These include the Zero-dose Immunization Programme (ZIP), through which Gavi has made US\$100 million available, but also funding linked to COVID-19 vaccine roll-out. Gavi has identified two consortia led by World Vision and International Rescue Committee to lead the partnership with 11 countries (Burkina Faso, Cameroon, Central African Republic, Chad, Ethiopia, Mali, Niger, Nigeria, Somalia, South Sudan and Sudan), which are mapping zero-dose children in fragile and conflict settings, and conducting root cause and bottleneck analyses, with the active engagement of communities.

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<sup>21</sup> Fund for Peace. Fragile States Index Annual Report 2022. <https://fragilestatesindex.org/wp-content/uploads/2022/07/22-FSI-Report-Final.pdf>

<sup>22</sup> [https://data.unicef.org/topic/child-health/immunization/#\\_ftn1](https://data.unicef.org/topic/child-health/immunization/#_ftn1)

<sup>23</sup> [https://drive.google.com/file/d/1R7BecCx\\_JGxIAZQVcQDtzhAo\\_La2ASJ5/view](https://drive.google.com/file/d/1R7BecCx_JGxIAZQVcQDtzhAo_La2ASJ5/view)

<sup>24</sup> <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/01/Disaster-Response-Mobile-Money-for-the-Displaced.pdf>

<sup>25</sup> <https://www.wish.org.qa/reports/healthcare-in-conflict-settings-leaving-no-one-behind/>

COVID-19 vaccine roll-out provides an opportunity to strengthen health systems and platforms for the delivery of other essential interventions, including immunization. This approach is applicable to fragile and conflict settings as well as affected populations (e.g. refugees, asylum seekers, internally displaced populations).

The SP5.2 Working Group has focused on understanding where zero-dose children and missed communities are within fragile and conflict settings and what the drivers of inequity in service provision are in those settings. The Working Group has developed a theory of change for immunization in conflict settings and is linking this to the Full Portfolio Planning processes of Gavi for accessing Health Systems Strengthening and ZIP support once the drivers of inequity are identified in these settings and appropriate planning and microplanning have taken place.

Decision-making on what vaccines to implement needs scrutiny to ensure that all required vaccines are implemented. The focus should not just be on vaccines for diseases that can cause outbreaks in the shorter term, but on all vaccines in a country's immunization schedule, including PCV, rotavirus and HPV, particularly as conflicts now last an average of 17 years. The immediate focus is generally only on measles and polio, and longer-term impacts, such as the increased possibility of early onset of sexual behaviours that increase the risk of HPV infection, are often not considered. In some conflict situations, such as Myanmar, all vaccines may be affected<sup>26</sup>. A review of decision-making on this topic is being undertaken by the London School of Hygiene and Tropical Medicine.

Further efforts are also required to ensure wider adoption of the SAGE recommendation to increase the **upper age limit** for catch-up vaccination. Children living in conflict settings may have limited access to health care and miss out on vaccinations extending over seven years or more, but catch-up vaccination campaigns in some settings only include children up to 2 years of age.

**Data availability** is another critical issue for understanding the implementation of immunization programmes and estimating immunization coverage in fragile and conflict settings. The main challenge is the lack of reliable or quality data, as health records in these settings are more likely to have missing information, or data is stored in inaccessible areas or has been destroyed along with a health facility. Similarly, it is often difficult to estimate the target size (denominators) of highly mobile populations.

Further details can be found in Supplementary Document I.

### • SP 6.1 Global Healthy Vaccine Markets

*Indicator: Health of vaccine markets, disaggregated by vaccine antigens and country typology*

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#### *Take-home messages:*

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- Market health is a multi-faceted composite indicator incorporating the number of manufacturers, global reach and development pipelines.
- For 2021, the composite indicator was “healthy” for four vaccines, “concerning” for six vaccines and “unhealthy” for two (BCG and hexavalent vaccine).
- This situation is essentially the same as in 2020.

<sup>26</sup> <https://www.frontiermyanmar.net/en/fears-of-disease-outbreaks-as-child-vaccination-rates-plummet/>

The health of a vaccine market includes an assessment of the total number of suppliers, relative concentration among them, ability to distribute globally and the state of the development pipeline. The total number of suppliers making a specific vaccine gives only a partial picture; the market share of the two largest producers provides a sense of how balanced the market is between different suppliers, while “reach” indicates how many vaccines are truly available globally. Lastly, the “innovation” criterion indicates the number of vaccines in late-stage development. Markets with a small number of current global producers but with multiple products in the pipeline are viewed as healthier than those with fewer products in the pipeline.

Overall, the markets for the key vaccines used in low- and middle-income countries are trending towards greater diversity of suppliers and more stability. This is primarily due to Gavi’s financing of many of these vaccines, which has provided a stable predictable market and is encouraging new suppliers as well as ramp-up of production by existing manufacturers, enabling economies of scale to be realized.

Not all of the markets are at an equilibrium. The market for pentavalent vaccine, as the earliest of the Gavi-supported vaccines, is the most mature, with supply currently exceeding demand. This has led to a reduction in prices, and keeping that market balanced rather than over-supplied has been a challenge. While hexavalent vaccine is noted as “concerning”, this is a relatively modest market. Demand is likely to grow over time, but the pipeline suggests that its market status will shift as demand becomes clearer. For PCV, a new supplier has entered the market and it is anticipated that the market will become more diverse over the coming years. HPV is a less mature market and would benefit from further diversification. Lastly, BCG is a relatively old product with limited margin and there is little incentive for new suppliers.



Table 3: Health of vaccine markets, disaggregated by vaccine antigen

Vaccine <sup>a</sup> Year	Breadth (total producers <sup>b</sup> )	Supply– demand balance	Concentration (share for two largest producers <sup>b</sup> )	Reach (vaccines with global distribution <sup>c</sup> )	Innovation (vaccines in phase III clinical development)	Composite indicator
Bacille Calmette–Guérin (BCG)	22	Concerning	50%	4	1	Unhealthy
Human papillomavirus (HPV)	4	Concerning	99%	2	2	Concerning
Pneumococcal conjugate vaccine (PCV)	5	Concerning	97%	3	4	Concerning
Pneumococcal polysaccharide	4	Concerning	66%	1	1	Concerning
Measles	7	Balanced	96%	2	1	Concerning
Measles-rubella	6	Balanced	92%	2	2	Concerning
Measles-mumps-rubella (MMR)	7	Concerning	69%	3	1	Concerning
Penta (whole-cell pertussis-containing)	10	Balanced	50%	6	4	Healthy
Hexavalent DTaP-IPV-Hib-Hep B (acellular pertussis-containing)	3	Concerning	100%	2	1	Unhealthy
Tetanus-diphtheria	17	Balanced	73%	5	1	Healthy
Inactivated polio vaccine, stand-alone	10	Over capacity	100%	4	4	Healthy
Rotavirus	4	Balanced	74%	4	2	Healthy

<sup>a</sup>Vaccines for which a global market assessment is available from the WHO or UNICEF in the given year. Source is MI4A Market Studies, unless otherwise specified.

<sup>b</sup>Producers of bulk antigen.

<sup>c</sup>Includes prequalified vaccines and vaccines with a large number of country registrations.

Unhealthy: the market does not have a stable and diverse supply.

Concerning: the market has a significant concentration of supply with a potential for market disruption.

Healthy: the market has a diverse and stable supplier base.

### • SP 6.2 Financial resources for immunization programmes

*Indicator: Proportion of countries whose domestic government and donor expenditure on primary health care increased or remained stable*

Data are not available until December 2022 for this indicator.

### • SP 6.3 Immunization expenditure from domestic resources

*Indicator: Proportion of countries whose share of national immunization schedule vaccine expenditure funded by domestic government resources increased or remained stable*

#### Take-home messages:

- 37 low- and middle-income countries reported expenditure on vaccines for all 4 years (2018–2021). This represents 27% of all low- and middle-income countries.
- From this sample of countries, 62% reported the share of expenditure on vaccines paid by government increased or remained stable between 2020 and 2021 (baseline: 59% between 2018 and 2019) (Figure 29).

- The figure for 2020–2021 was slightly lower for Gavi-eligible countries (57%) and slightly higher for non-Gavi-eligible middle-income countries (71%).
- Data availability remains an issue given low reporting across all four years. Methodology may need to change to ensure more meaningful reporting (e.g. comparing 2-year averages).
- The analysis does not include domestic expenditure on COVID-19 vaccination.
- Although some progress is apparent, further efforts are required to promote greater political commitment to immunization and adequate domestic financing.

The financial sustainability of national immunization programmes will ultimately depend on the availability of domestic funding to support all national immunization activities. Progress towards this long-term goal is monitored through an indicator tracking sustained or increasing domestic investment in immunization in low- and middle-income countries. The growth rate from 2020 to 2021 shows an encouraging trend relative to the baseline (Figure 29).

However, this is based on data from only around a quarter of low- and middle-income countries and there are concerns about the quality of the data provided. WHO, UNICEF and other partners are working with countries to improve the response rate and quality of the data reported. Partners are also exploring how national health accounts could be used to improve the quality of reporting of expenditure data.

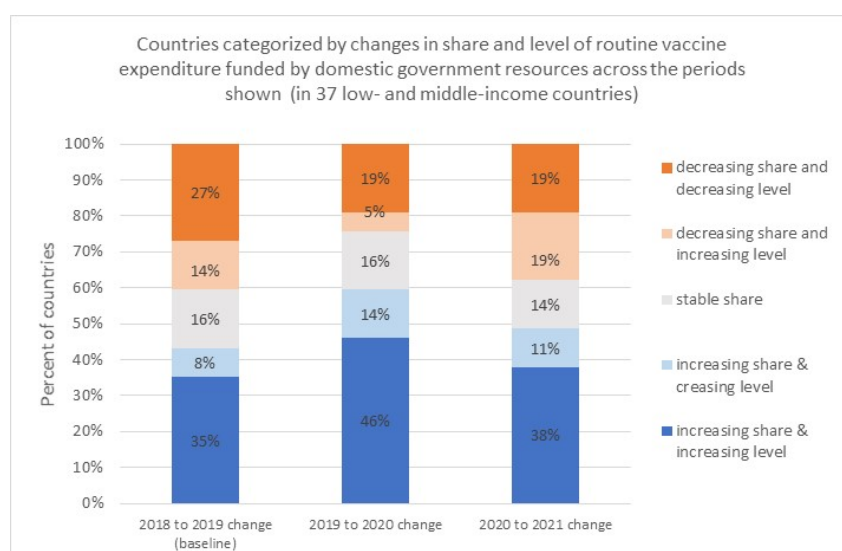


Figure 29: Trends in national vaccine expenditures funded by domestic government resources in 37 low- and middle-income countries.

The IA2030 SP6 Sustainable Financing Working Group plans to develop **use cases** that demonstrate the utility of the budget and expenditure data for national immunization programme decision-making and global and regional partner resource allocation.

## • SP 7.1 Capacity for innovation

*Indicator: Proportion of countries with an immunization research agenda*

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### *Take-home messages:*

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- 23 out of 179 (12.8%) countries reported through the eJRF having a national agenda for research on immunization.
- 14 out of these 23 countries (60.9%) were either upper middle-income or high-income countries; nine (39.1%) were lower middle-income or low-income countries.
- Of the 79 lower middle-income and low-income countries that provided information through the eJRF, only nine (11.4%) reported having a research agenda.

The data suggest that relatively few countries have a national agenda for research on immunization. Actual numbers could be even lower, as countries were asked to attach documentation or provide a link to their research agendas, but only eight countries (4.4%) provided relevant documentation/links.

Given that so few countries reported having a research agenda for immunization, the SP7 Working Group is discussing whether encouraging countries to develop stand-alone research agendas on immunization is appropriate or whether research priorities should be integrated into broader health systems research strategies. This encouragement needs to recognize that countries are having to pay attention to the basics in immunization, and that funding for SP7-related research remains a huge challenge in many LMICs.

As such, encouragement should be recommended in the context of and tempered by competing priorities directed towards more fundamental immunization activities. That said, providing countries with research agenda examples may facilitate their efforts to define research priorities for immunization within their local context. In addition to and/or supportive of country-level research agendas, regional-level research agendas could also be considered and developed, including regionally aligned core research protocols, if appropriate.

## • SP 7.2 New vaccine development

*Indicator: Progress towards global research and development targets*

Efforts are underway to establish a mechanism and methodology to identify priority pathogens for new vaccine development, to serve as indicators for SP7, through engagement of key stakeholders at the country, regional and global levels. This is based on a partnership between the SP7 Working Group, WHO's Product Development for Vaccines Advisory Committee (PDVAC) and members of Regional Immunization Technical Advisory Groups (RITAGs). To date, there is consensus that TB, HIV, malaria and, potentially, COVID-19 are considered global pathogen targets for new vaccine development.

The aim of the regional and global lists is to create alignment among regional and global health research and innovation organizations on which vaccine research and development efforts should be supported. Regional and global lists may also assist low- and middle-income countries that are establishing local production of vaccines in deciding which pathogens to target for vaccine development, based on their regional context. Multinational vaccine manufacturers, biotech companies, and academic and other research organizations may also use the information to determine their priorities for vaccine research and development.

If regional stakeholders are interested in partnering on this prioritization exercise, the proposed approach could identify pathogen priorities by WHO region. Since the prioritization methodology (PAPRIKA<sup>27</sup>) is based on multi-criteria decision analysis, the criteria, and therefore the pathogen priorities, are likely to differ by socio-economic status. Some common priorities across multiple regions may be identified as global pathogen priorities for new vaccine development.

#### • SP 7.3 Evaluate promising innovations and scale up innovations

*No indicator*

Implementation and operational research is essential for evaluating promising innovations to increase immunization scale-up and ultimately vaccine coverage. The need for implementation and operational research is anticipated to increase, particularly in those contexts where coverage and equity are most challenging (e.g. displaced populations and conflict zones). Despite this increasing need, a well-defined implementation and operational research and innovation agenda with associated indicators remains a key gap. More systematic and evidence-based approaches will be needed to set priorities for innovations that meet real-world needs.

In the research and innovation area, definitions of some of the core challenges are not unified. The priorities for innovative services and practices are therefore fragmented. Furthermore, national, regional and global fora for defining, monitoring and evaluating implementation and operational research and innovation agendas are not necessarily aligned or in some cases may not even exist. Working Group 7 has identified this as a critical gap, will work to define a working problem/opportunity statement through leveraging existing tools and ongoing reviews, and consider how best to close this gap.

#### D.4 IA2030 interactive scorecard

The IA2030 interactive scorecard enables stakeholders at all levels – global, regional and country – to monitor the status of each indicator in the IA2030 Framework for Action. The scorecard supports coordinated operational planning, ownership and accountability, and communication and advocacy.

The scorecard provides a visual representation of progress toward the seven IA2030 impact goals and the 15 strategic priority objective indicators (Figure 30). At the regional level, the scorecard facilitates comparison across regions and serves as a communication tool to drive conversations around strengthening of immunization programmes. At the country level, the scorecard can help immunization programme managers and other stakeholders to compare performance against global and regional averages and with other countries.

Following publication of a static scorecard in 2021, the interactive version was launched in 2022<sup>28</sup> and is due to be updated with 2021 data in September 2022.

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<sup>27</sup> Hansen P, Ombler F. A new method for scoring additive multi-attribute value models using pairwise rankings of alternatives. *J. Multi-Criteria Decision Analysis*. 2008;15(3-4): 87–107

<sup>28</sup> <https://scorecard.immunizationagenda2030.org>

## IMPACT GOAL INDICATORS – GLOBAL

The Immunization Agenda 2030's Framework for Action articulates three Impact Goals for the next decade—Prevent Disease, Promote Equity, and Build Strong Programmes. Global progress toward the Impact Goals will be measured with the seven indicators below, which will serve to mobilize commitment and resources, guide operational planning, and ensure accountability. Click on any indicator to explore its data in more detail.

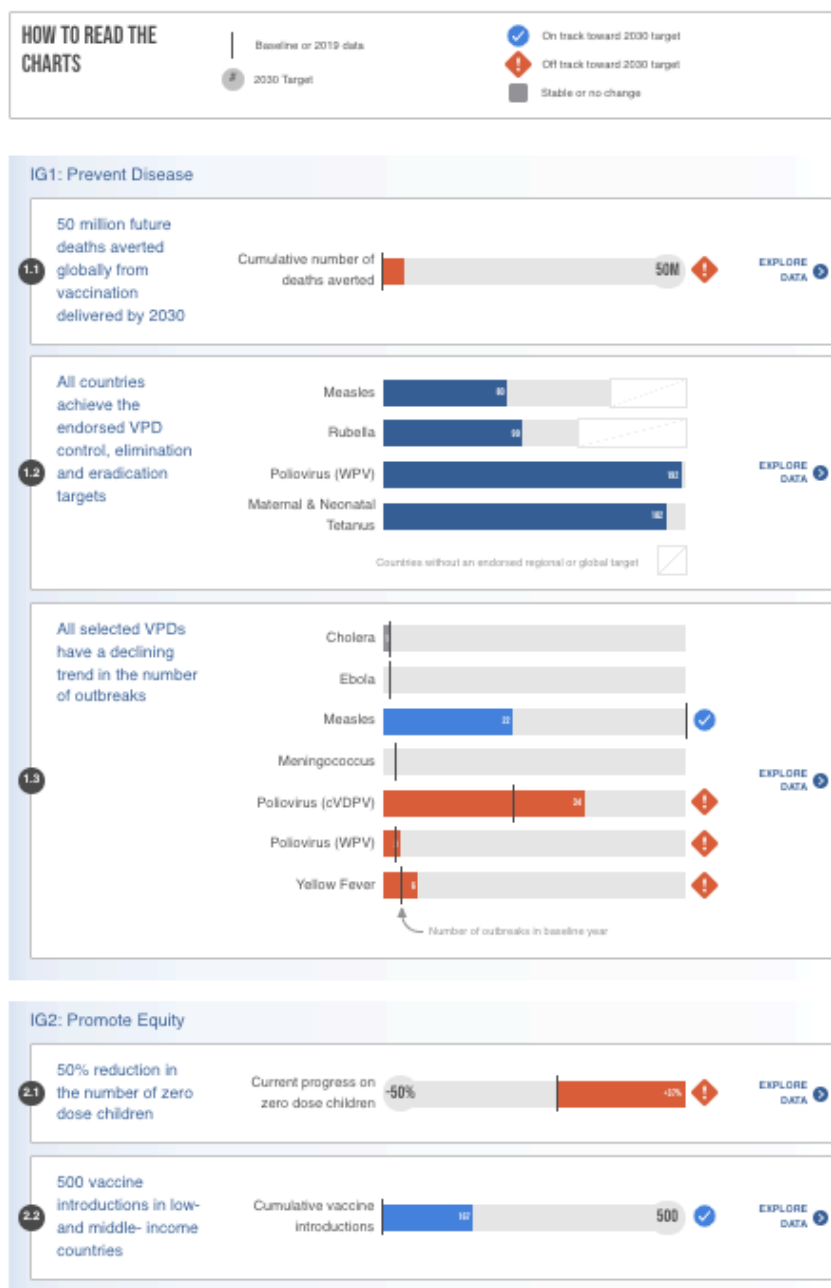


Figure 30: A sample visualization from the IA2030 interactive scorecard.

## E. IA2030 implementation

In May 2021, the World Health Assembly expressed its support for implementation of IA2030 through the IA2030 Framework for Action<sup>29</sup>, which provides more detail on specific areas of implementation – coordinated

<sup>29</sup>Implementing the Immunization Agenda 2030: A Framework for Action through Coordinated Planning, Monitoring & Evaluation, Ownership & Accountability and Communications & Advocacy. <http://www.immunizationagenda2030.org/framework-for-action>

planning, monitoring and evaluation (M&E), ownership and accountability, and communications and advocacy. It emphasizes the particular role of regions and countries.

## E.1 Countries

The **National Immunization Strategy** approach supports countries through a systematic strategy-development process aligned with IA2030 and Gavi frameworks. It incorporates a formal planning process focused sequentially on situational analysis, prioritization, budget dialogue between ministries of health and finance, and integration with wider health sector planning. It incorporates costing tools and is supported by a range of implementation guidance materials. All areas of immunization programme function are covered, including COVID-19 vaccination.

The National Immunization Strategy is seen as a successor to comprehensive multi-year plans (cMYPs). It is envisaged that countries will develop a new National Immunization Strategy at the end of their current cMYP cycle or when undertaking new health strategy development. A series of webinars have been organized in 2021 and 2022 to introduce the new approach and to provide support to countries going through the National Immunization Strategy development process. As of August 2022, six pilot countries had completed National Immunization Strategy development, 15 were in mid-development and 24 were planning to begin development in Q3/Q4 2022 (Table 4).

Table 4: Development of National Immunization Strategies

Region	Completed	Ongoing	Planned Q3/Q4 2022
<b>Africa</b>	Côte d'Ivoire Ethiopia Tanzania	Angola, Burkina Faso, Cameroon, Central African Republic, Comoros, Eritrea, Madagascar, Rwanda, Uganda, Zimbabwe	Benin, Botswana, Guinea-Bissau, Lesotho, Mali, Malawi, Namibia, Niger, Seychelles, South Africa, South Sudan, Togo, Zambia
<b>Americas</b>			Bolivia, Haiti
<b>Eastern Mediterranean</b>		Djibouti, Lebanon	Yemen
<b>European</b>		Tajikistan	Kazakhstan, Uzbekistan
<b>South-East Asian</b>		Bangladesh	Sri Lanka, Nepal
<b>Western Pacific</b>	Cambodia, Papua New Guinea	Philippines	Lao People's Democratic Republic, Mongolia, Solomon Islands, Viet Nam

## E.2 Regions

Most regions have developed Regional Strategic Plans or Frameworks based on IA2030 to guide their activities over the decade. Some have also begun to develop shorter-term implementation plans. Regions have also begun to develop monitoring and evaluation frameworks aligned with the global framework but tailored to local contexts.

The main priority for regions during 2021 and 2022 has been to support effective rollout of COVID-19 vaccination. Each region has sought to identify ways to protect essential immunization services during rollout, to promote integration between COVID-19 and existing immunization activities, and to use COVID-19 as an opportunity to build platforms for immunization across the life-course. Regions have also begun to support countries developing new National Immunization Strategies aligned with IA2030.

Further details can be found in Supplementary Document J.

### E.3 Working Groups

IA2030 Working Groups became operational during 2021, have been establishing their “niche” and identifying priority focus areas (Supplementary Document K). Capacity constraints have made it difficult for Working Groups to achieve their initial targets. Competing priorities, limited bandwidth of Working Group members and lack of concrete action items within Working Groups’ scope of work have in some cases acted as barriers to achieving targets. Efforts are being made to improve efficiencies by working with existing platforms to align activities and avoid duplication of efforts and through coordination across Working Groups (for example through monthly meetings of Working Group Leads).

Some progress has been made on **consultative engagement**, primarily through collaboration with the Geneva Learning Foundation (TGLF), which organizes a digitally enabled peer learning programme for immunization and other healthcare professionals in low- and middle-income countries (Box 4). Although there is interest among Working Groups in consultative engagement, the main challenge has been uncertainty regarding the best avenues to reach and engage with country-level practitioners and partners across all countries.

Working Groups are continuing to refine their membership to ensure global representativeness and discussions are being held on the possible integration of Working Groups with shared interests or creation of new Working Groups to close gaps. Further details can be found in Supplementary Document K.

#### Box 4: Consultative engagement

**Working Groups have been working with the Geneva Learning Foundation (TGLF) on innovative new methods of consultative engagement.**

TGLF organizes digitally enabled peer learning programmes for health practitioners in low- and middle-income countries, including those working in immunization, with countries in Central and West Africa particularly well represented. Participants select a local challenge and are guided through a process of analysis, action plan development and implementation, supported by their peers and with input from global experts.

In 2021 and 2022, programmes were organized focused on IA2030, with more than 6000 practitioners applying to join a “Movement for IA2030” programme in 2022, through a project supported by Wellcome. This has provided an opportunity to pilot a range of methods of consultative engagement to gather practitioners’ perspectives on key immunization issues and to listen and learn from the experience and ingenuity of practitioners developing local-level solutions to their priority challenges.

Discussion and experience-sharing events were organized with Working Groups 1 and 3, and UNICEF, covering issues such as COVID-19 and routine immunization, COVID-19 vaccine hesitancy, zero-dose challenges, gender barriers and other issues. A variety of methods of engagement and outputs have been piloted, generating valuable insights into local-level perspectives and practices.

## E.4 Global

The **IA2030 Partnership Council**, which provides the strategic leadership for IA2030, convened for an inaugural session on 22 September 2021. As well as its ongoing interactions, it meets formally twice a year and reports directly to the World Health Assembly biannually, starting in 2022. It includes senior leaders representing a mix of partners, regions and civil society.

Day-to-day management of IA2030 is the responsibility of the **IA2030 Coordination Group**, which has been meeting monthly since May 2021, supported by a small IA2030 secretariat. The IA2030 Coordination Group has nine Director-level members and rotating co-chairs.

In July 2022, following the publication of WUENIC data for 2021, an extraordinary meeting of the IA2030 Coordination Group was organized to discuss urgent joint responses to the backsliding identified. A range of priority actions were identified, along with practical steps to catalyse actions to address the worrying declines seen over the past two years (Box 5).

### Box 5: IA2030 Coordination Group extraordinary meeting

The IA2030 Coordination Group convened an extraordinary meeting with partners, regional representatives and Working Group Leads in July 2022 to discuss and identify possible responses to the 2021 WUENIC data and to halt the backsliding seen in 2020 and 2021.

Proposed actions included:

- Setting up a “knowledge-sharing hub” to improve sharing of analyses and intelligence across partners.
- Refocusing or improved leveraging of COVID-19 resources (e.g. the Access to COVID Tools Accelerator, COVAX).
- Launching a political advocacy campaign and building a political movement.
- Further defining what technical support is needed given limited support capacity, while keeping countries in the lead.

Partners also agreed a series of practical steps by which these actions could be taken forward.

## E.5 Communications and Advocacy

The Communications and Advocacy Working Group helped to support the formal launch of IA2030 during World Immunization Week in April 2021. Launch activities engaged many partners and leveraged various platforms, communicating IA2030’s vision and objectives to global audiences.

The aims of the working group are to:

- Ensure immunization remains high on the global health agenda and is integrated with broader themes such as the Sustainable Development Goals, Universal Health Coverage, nutrition and gender.
- Ensure socialization and prioritization of the need to identify and reach zero-dose children with immunization as a tracer for marginalized communities most left behind.



- Ensure strong ownership of IA2030 by Member States to drive prioritization and progress on immunization.
- Reinforce accountability for progress on immunization goals and targets, and to recognize and celebrate success.
- Advocate for sufficient financing for essential immunization efforts, including vaccine-preventable disease surveillance for all countries.

In addition to the launch activities in 2021, the group has helped to mobilize political will of Member States and partners through various activities and events, including a historic cross-regional statement<sup>30</sup> made on behalf of the six WHO regions and 50 countries; by August 2021, 50 organizations had signed an open letter on the Immunization Agenda 2030 website<sup>31</sup> calling on government representatives to support IA2030. High-profile events included High-Level Political Forum Side Event in July 2021, United Nations General Assembly Virtual Side Event in September 2021 and a World Health Assembly Side Event in May 2022, at the Permanent Missions of Canada.

Future communications and advocacy activities will focus on priority areas including regional and country engagement to align efforts and amplify progress, engagement with multiple groups of stakeholders such as civil society groups, parliamentarians, youth and faith-based organizations, promoting use of the IA2030 scorecard, amplifying efforts around key milestones and events in 2022–2023, and promoting linkage between IA2030 and other immunization strategies and wider global health-related initiatives.

## E.6 Monitoring and Evaluation

The Monitoring and Evaluation Working Group provides guidance on the implementation of IA2030 monitoring, evaluation, and action cycles and has been working closely with groups monitoring global IA2030 indicators. It has developed a standardized template for Working Group reporting and has supported Working Groups in the interpretation and analysis of indicator data for 2021.

Considering lessons learned from the previous decade's Global Vaccine Action Plan, proposed methods to ensure a closer link between M&E and implementation for IA2030 include:

- Ensuring drafted recommendations for action are consistent with programmatic evidence and are actionable.
- Defining linkage of recommendations to processes to drive action.
- Developing a feedback loop to track progress on implementation of recommendations.

Future focus will include refinements to the IA2030 M&E Framework of indicators, implementation of the IA2030 learning agenda for M&E, and further methods development for implementation of monitoring evaluation and action cycles with feedback loops at global, regional and country levels.

A data timeliness sub-group, comprising members of the Data Strengthening and Use Working Group, the Monitoring and Evaluation Working Group and other stakeholders, is exploring ways in which more up-to-date immunization data can be collated to support global decision-making and action.

<sup>30</sup> <https://geneva.usmission.gov/2021/05/28/us-canada-joint-statement-on-immunization-agenda-2030/>

<sup>31</sup> <https://www.immunizationagenda2030.org/pledge-support>

## F. Conclusion

Global health in 2021 continued to be dominated by the COVID-19 pandemic. COVID-19 has disrupted health service delivery and healthcare-seeking behaviours, and compounded human resource challenges, while COVID-19 vaccination programmes have been a top priority during 2021, sometimes at the expense of other health services. These factors have contributed to backsliding in many areas of healthcare, including immunization (other than against COVID-19). Hesitancy associated with COVID-19 vaccination may also have negatively affected uptake of essential vaccination.

Unfortunately, recovery will be impeded by the longer-term economic consequences of the pandemic, as well as multiple other geopolitical challenges, including conflict in Eastern Europe, which is having global reverberations. This challenging global context argues strongly for coordinated responses that maximize the gains derived from global and national investments, from integrated catch-up campaigns to health systems strengthening and workforce development that benefits all areas of primary healthcare, including but not restricted to immunization.

In particular, it is essential that COVID-19 response funding is leveraged to leave a lasting legacy in terms of strengthened and sustainably financed health systems. There are also important opportunities to leverage the multi-partner, multi-sector collaboration, rapid innovation and knowledge sharing, and increased investments made during COVID-19 vaccine rollout to better prepare for future pandemic threats.

The first year of the IA2030 decade has been marked by unprecedented challenges that were unforeseen when the IA2030 strategy was conceived. Even so, IA2030 includes an architecture and set of principles that can guide a coordinated global response to these unprecedented challenges. All immunization stakeholders recognize the gravity of the situation and the need for urgent action to close growing immunity gaps, and to arrest and reverse the declines in immunization seen in the past two years.

Immunization is at a watershed moment. Now is when action is needed to ensure that the goals of IA2030 are not something found only in a document.

## G. Annex 1: Recommendations for M&E Framework Refinements

### ME&A cycle process updates:

- Ensure early engagement of IA2030 Working Groups with regions for coordinated input into the development of the IA2030 Technical Progress Report, including development of a robust methodology to generate global recommendations for consideration by SAGE that are informed by regional and country-level perspectives and priorities.
- Work to further improve IA2030 reporting so that the IA2030 Technical Progress Report becomes a better tool to guide decision-making, highlighting critical areas that require attention following an informed and critical interpretation of the IA2030 M&E Framework findings and with practical recommendations for consideration by SAGE for IA2030 Strategic Priority Objectives.

### Indicator updates/revisions:

- Work with IA2030 Working Groups, indicator champions and regions to revise indicators and processes that have been identified for potential improvements.

Indicator	Description of process improvements needed	Revision needed to indicator definition
IG 1.1 Future deaths averted	None identified.	No revision planned in next year. Plan for revision by 2025 to include additional pathogens in modelled estimates (polio, typhoid, seasonal influenza, cholera, multivalent meningitis, COVID-19, varicella, dengue, mumps, rabies, hepatitis A, hepatitis E, and other new vaccines). Consider possible updates of the 2030 target, given recent revisions to the baseline population sizes, which are lower than those previously used to calculate the annual targets.
IG 1.2 Achievement of VPD control, elimination, eradication targets	Establish an annual process for countries' VPD-specific data to be reported from WHO regions to WHO headquarters.	No revision identified.
IG 1.3 Large or disruptive VPD outbreaks	None identified.	Revision is needed to the definition of large or disruptive outbreaks, given requests received from disease programs.
IG 2.1 Number of zero dose children	None identified.	No revision identified.
IG 2.2 Vaccine introduction in low and middle-income countries	None identified.	No revision identified.
IG 3.1 Vaccination coverage across the life course (DTP3, MCV2, PCV3, HPVc)	None identified.	No revision identified.
IG 3.2 UHC Index of Service Coverage	None identified.	Consultation needed with SP1 WG, Primary Health Care Performance Initiative (PHCPI), and DDI representatives to consider possible revision for inclusion of PHC indicators.
SP 1.1 Proportion of countries with evidence of adopted mechanism for monitoring, evaluation and action at national and sub-national levels	None identified.	Consultation needed with Global National Immunization Technical Advisory Group (NITAG) Network Secretariat to further define and document success criteria for meeting the indicator component on NITAG functionality.
SP 1.2 Density of physicians, nurses and midwives per 10,000 population	None identified.	No revision identified.

Indicator	Description of process improvements needed	Revision needed to indicator definition
SP 1.3 Proportion of countries with 90% on-time reporting from 90% of districts for suspected cases of all priority vaccine-preventable diseases included in nationwide surveillance (including reporting of zero cases)	Consultation needed with SP 1.3 indicator champions to use lessons learned from indicator pilot study to improve data collection processes.	Consultation is needed with SP 1.4 indicator champions to revise the questions in the eJRF for the next data collection to improve clarity and interpretation.
SP 1.4 Proportion of service delivery points with full availability at service delivery level of DTP and MCV (mean across countries)	None identified.	Consultation needed with SP 1.4 indicator champions to revise this indicator, given concerns about accuracy of data received for the new questions that were added to the eJRF in 2022 data collection.
SP 1.6 Proportion of countries with at least 1 documented (with reporting form and/or linelisted) individual serious AEFI case safety report per million total population	None identified.	No revision identified.
SP 2.1 Proportion of countries with legislation in place that is supportive of immunization as a public good	None identified.	Consultation needed with SP2 WG to review and assess how meaningful this indicator is to measure commitment.
SP 2.2 Percentage of countries that have implemented behavioral or social strategies (i.e. demand generation strategies) to address under-vaccination	None identified.	Consultation needed with SP2 WG to consider revisions to this indicator.
SP 3.2 DTP3, MCV1, and MCV2 coverage in 20% of districts with the lowest coverage (mean across countries)	None identified.	No revision identified. Consultation needed with regions to confirm understanding of reporting processes and highlight caveats to analysis and interpretation.
SP 4.1 Breadth of protection: mean coverage for all vaccine antigens recommended by WHO	None identified.	No revision identified.
SP 5.1 Proportion of polio, measles, meningococcal disease, yellow fever, cholera and Ebola outbreaks with timely detection and response (includes only outbreaks with an outbreak response vaccination campaign)	None identified.	Revision needed to adjust the definition of timely response, following request from a disease programme. Clarify that the scope of this indicator is only for countries that receive direct support for outbreak response.
SP 6.1 Level of health of the vaccine market, disaggregated by antigen and country typology	None identified.	No revision identified.
SP 6.2 Proportion of countries whose domestic government and donor expenditure on primary health care increased or remained stable	None identified.	No revision identified.
SP 6.3 Proportion of countries whose share of national immunization schedule vaccine expenditure funded by domestic government resources increased	Consultation needed with SP6 Working Group to consider revision of the methodology for computing the indicator and to explore how national health accounts could be used to improve the quality of JRF reporting on expenditure data.	Consultation needed with SP6 group to consider if indicator revisions needed.
SP 7.1 Proportion of countries with national agenda for research on immunization	None identified.	No immediate revision identified.
SP 7.2 Progress towards global research and development targets	None identified.	Consultation needed with the SP7 WG as they finalize a proposed short list of pathogen targets for new vaccines (where vaccines do not yet currently exist), for endorsement by WHO SAGE in March 2023.